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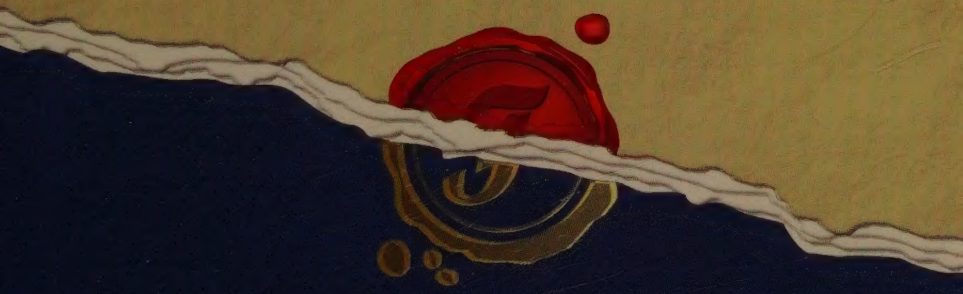
A Study in the Origins and First Development of the Art of Counting Time Among the Primitive and Early Culture Peoples



by

Martin P. Nilsson

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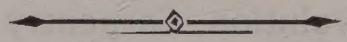

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I.

MARTIN P. NILSSON

PRIMITIVE TIME-RECKONING

PRIMITIVE TIME-RECKONING

A STUDY IN THE ORIGINS AND FIRST DEVELOPMENT OF THE ART OF COUNTING TIME AMONG THE PRIMITIVE AND EARLY CULTURE PEOPLES

BY

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PREFACE.

Although in the present study I devote only a few pages to the Greek time-reckoning, and am engaged for the most part in very different fields, yet the work has arisen from a desire to prepare the way for a clearer view of the initial stages of the Greek time-reckoning. In the course of my investigations into Greek festivals I had from the beginning been brought up against chronological problems, and as I widened the circle so as to include the survivals of the ancient festivals in the Middle Ages, more particularly in connexion with the origin of the Christmas festival, I was again met by difficulties of chronology, this time in regard to the earlier Germanic time-reckoning. In the year 1911 I published in *Archiv für Religionswissenschaft* an article on the presumptive origin of the Greek calendar circulated from Delphi. These preliminary studies led to my taking over myself, in the projected Lexicon of the Greek and Roman Religions, the article on the calendar in its sacral connexions. This article was worked out in the spring of 1914. In it the emphasis was laid not on the historical chronological systems, which have little to do with religion, but on the question of origins, in which religion plays a decisive part. In order to arrive at an opinion it was not enough to work over once more the extremely scanty material for the origin of the Greek time-reckoning; I had to form an idea from my hitherto somewhat occasional ethnological reading as to how a time-reckoning arose under primitive conditions, and what was its nature. This idea obviously required broadening and correcting by systematic research. The war, which suspended the continuation of the Lexicon at its very beginning, gave me leisure to under-

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take this more extensive research. Certainly it has also imposed some limitations on the work, since I could not make use of the rich libraries of England and the Continent but had to be content with what was offered by those of Sweden and Copenhagen. But I am not disposed to regret this limitation too deeply. The material here reproduced will probably strike many readers as being copious and monotonous enough, and the numerous books of travels and ethnological works which I have ransacked, often to no profit, seem to hold out little prospect that anything new and surprising will come to light. In this conviction Webster's work has strengthened me.

In two or three instances I have derived material of great value from personal communications. For very interesting details of the time-reckoning of the Kiwai Papuans I am indebted to Dr. G. Landtman of Helsingfors, and Prof. G. Kazarow of Sofia has sent me valuable information as to the Bulgarian names of months. Dr. C. W. von Sydow of Lund has communicated to me details of the popular time-reckoning in Sweden.

An exhaustive examination of all the material obtainable would doubtless lead to a more exact conception of the details of primitive time-reckoning. Above all, large districts with similar peculiarities in time-reckoning could be more accurately defined. The Arctic regions form a district of this nature. South America again differs characteristically from North America; Africa, the East Indian Archipelago, and the South Sea Islands all have their peculiarities. The borrowings which have undoubtedly taken place on a very large scale would be at least in part pointed out. This working up of the material is however the task of the ethnological specialist; my object is simply and solely to attain the above-mentioned goal of a general foundation.

The observation of chronological matters varies greatly in the ethnographical literature; I have gone through many books without result, and in other cases my gains have often been small. It is only in quite recent times that attention has been paid with any great profit to this side of primitive life. Among the English

authors Frazer has drawn up a list of ethnological questions (printed in the *Journal of the Royal Anthropological Institute, 18,* 1889, pp. 431 ff., and also separately), paying due attention to time-reckoning, which has had a lasting and happy result, as can be seen especially in many papers in the *JRAI* of succeeding years.

Of the works of my predecessors only one has had any more elaborate aims — the ninth chapter of Ginzel's handbook, which deals with the time-reckoning of the primitive peoples, divided up according to the different parts of the world. The significance of the time-reckoning of the primitive peoples for the history of chronology seems to have been only gradually grasped by the author in the course of his work, since it is not until after he has touched occasionally upon the question of primitive time-reckoning in the course of his account of the chronological systems of the Oriental peoples that he inserts the chapter in question between the latter and the chapters on the chronology of antiquity. Ginzel has in many respects a sound view of the nature of primitive time-reckoning, and makes many pertinent remarks, but on the whole his treatment, as is not seldom the case, is lacking in exactness and depth. I have gratefully made use of the material collected by him, going back, wherever possible, to the original sources. Of other previous works must be mentioned the essays of Andree and Frazer on the Pleiades, — the latter especially distinguished by its author's usual extensive acquaintance with the sources and by its abundance of material — and the dissertation of Kötz upon the astronomical knowledge of the primitive peoples of Australia and the South Seas, an industrious work which however only touches superficially upon the problems here dealt with, and in regard to the lunisolar reckoning adopts the view of Waitz-Gerland: — "We can here discover nothing accurate, since these peoples have conceived of nothing accurately" (p. 22). I think however that we may fairly say that this is to estimate too meanly the possibility of our knowledge. Hubert's paper, *Étude sommaire de la représentation du temps dans la religion et la magie,* is composed throughout in the

spirit of the neo-scholastic school of Durkheim. The present work, on the other hand, is based upon facts and their interpretation.

The book was ready in the spring of 1917, but could not be published on account of the war. Later I have only inserted a few improvements and additions. As I was putting the finishing touches to my work, there came into my hands, after a delay due to the circumstances of the time, the *Rest Days* of H. Webster, whose *Primitive Secret Societies* has gained him fame and honour. This work deals in detail with a subject akin to mine, but not from the calendarial and chronological standpoint here adopted. Only upon the origin of the lunisolar calendar does the author make a few general remarks (pp. 173 ff.), which however do not advance the subject very far. In the chapters entitled *Market Days, Lunar Superstitions and Festivals, Lunar Calendars and the Week* he has brought together abundant material which also concerns some of the phenomena treated by me; part of this information will not be found here, since it is compiled from sources inaccessible to me. For the same reason, because I could not collate it for myself, I have not thought it advisable to introduce this material into my book, especially since it adds no new principle of knowledge and does not affect the conclusions I have drawn. Moreover anyone who wishes to go farther into these matters must in any case approach Webster's careful work.

For the popular month-names of the European peoples I have made use of the well-known extensive collections of Grimm, Weinhold, Miklosisch, etc. In this chapter my object has not been to make contributions to our knowledge of the popular months, but only to bring out, by means of numerous examples, the parallel between the popular names of the Julian months and the names of the lunar months among the primitive peoples. More isolated and disputed names are therefore omitted, and the names are given chiefly in translation. I have made only one exception, namely in the case of the Swedish lunar months, which really hardly belong to my subject since they are a popular development from the ecclesiastical calendar of the Middle Ages. I hope however to be

excused for this, in the first place on patriotic grounds, and secondly because little attention has hitherto been paid to the matter. In another place I have dealt fully with the Swedish names of months, which are in the majority of cases not of popular origin.

I have made out a list of authorities so that in the foot-notes reference may be made simply to the name of the author; where an author is represented by two or more works, the work in question is denoted by an abbreviation. This list is to be regarded not as an exhaustive bibliography, but merely as an aid to the quotations. Where so many quotations have been made it has been thought advisable not to use inverted commas, except in a few special cases. The fact that the quotations are nevertheless given as far as possible in the author's own words must be held to excuse a certain apparent inconsistency in the use of tenses.

Since I was obliged to include in my work the preliminary stages of the time-reckoning of the culture peoples, I had to deal with languages with which I was altogether unfamiliar, or only imperfectly acquainted. I have therefore often availed myself of the expert advice which has been readily given me by friends and colleagues. For help in the complicated questions belonging to the domains of the Semitic languages and Anglo-Saxon respectively I am especially indebted to my colleagues Professors A. Moberg and E. Ekwall. For occasional advice and information I have to thank Docent Joh. Pedersen of Copenhagen (for the Semitic languages), Prof. Emil Olson of Lund, and Prof. H. Lindroth of Gothenburg (for the Scandinavian), and Docent S. Agrell of Lund (for the Slavonic).

The English translation is the work of Mr. F. J. Fielden, English Lector in the University of Lund, who has also read the proof-sheets. I am greatly obliged to him for his conscientious performance of a lengthy and by no means easy task.

Lund, *May* 1920. *Martin P. Nilsson.*

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INTRODUCTION.

The ancient civilised peoples appear in history with a fully-developed system of time-reckoning — the Egyptians with the shifting year of 365 days, which comes as nearly as possible to the actual length of the year, counting only whole days and neglecting the additional fraction; the Babylonians and the Greeks with the lunisolar, varying between twelve and thirteen months and arranged by the Greeks from the earliest known period of history in the cycle of the *Oktaeteris.* It has always been clear that these systems of time-reckoning represent the final stage of a lengthy previous development, but as to the nature of this development the most daring hypotheses have been advanced. Thus, for example, eminent philologists and chronologists have believed the assertion of Censorinus, Ch. 18, and have supposed that the *Oktaeteris* was preceded by a *Tetraeteris,* even by a *Dieteris.* It may indeed at once be asserted that such a hypothesis lacks intrinsic probability. To account for the early development hard facts are needed, and unfortunately these, especially in the case of the Greeks, are extremely few. Where they are required they must be sought elsewhere.

Setting aside all ingenious but uncertain speculations, our only practicable way of proceeding is by means of a comparison with other peoples among whom methods of time-reckoning are still in the primitive stage. This is the ethnological method which is so well-known from the science of comparative religion, but the claims of which have been so vigorously contested upon grounds of no small plausibility. Fortunately this dispute need not be settled in order to prove the validity of the comparative method for an investigation

into the origin and development of methods of reckoning time. The gist of the dispute may be expressed as follows: — The ethnological school of students of comparative religion assumes that the intellect of the natural man can only master a certain quite limited number of universal conceptions; from these spring more and more abundantly differentiated and complicated ideas, but the foundation is everywhere the same. Hence our authority for comparing the conceptions of the various peoples of the globe with one another in order to lay bare this foundation. The opponents of the school deny the existence of these fundamental conceptions, and maintain that the points of departure, the primitive ideas of the various peoples, may be as different as the peoples themselves, and that therefore we are not authorised in drawing general conclusions from the comparison or from the fundamental conceptions themselves.

In the matter of the indication and reckoning of time, however, we have not to do with a number of conceptions which may be supposed to be as numerous and as various as we please. At the basis lies an accurately determined and limited and indeed small number of phenomena, which are the same for all peoples all over the globe, and can be combined only in a certain quite small number of ways. These phenomena may be divided into two main groups: (1) the phenomena of the heavens — sun, moon, and stars — and (2) the phases of Nature — the variations of the climate and of plant and animal life, which on their side determine the affairs of men; these, however, depend finally upon one of the heavenly bodies, viz. the sun. The claim that the comparative ethnological method can be justified only when we are dealing with a narrowly circumscribed number of factors is therefore here complied with, owing to the very nature of the subjects treated. The comparative method does not shew how things have happened in a special case in regard to one particular people: it only indicates what *may* have happened. But much is already gained if we can eliminate the impossibilities, since from the complete result of the development, no less than in other ways, we may obtain a certain basis for our deductions.

For the investigation of primitive methods of time-reckoning

no special astronomical or other technical knowledge is needed: in fact, such knowledge has rather played a fatal part by causing attention to be paid exclusively to the system of time-reckoning and leading to constant attempts to discover older and more primitive systems. *A priori,* indeed, we might venture to state that a system is always based upon previous data: unsystematic indications of time precede the system of time-reckoning. These modest beginnings have been obscured from view by the prejudice in favour of the systematic technical and astronomical chronology. The only absolutely necessary thing is a clear idea of the apparent motions of the heavenly bodies, i. e. the sun, the moon, and the most important of the fixed stars, and of the phases of the climate and the life of animals and plants, which give the units of the time-reckoning.

For a statement of the course and phases of the heavenly bodies and the units of the time-reckoning given by these I refer to the article mentioned in the preface, the pertinent sections of which are here quoted: —

"*The units of the time-reckoning* are given by the motions of the heavenly bodies (expressed according to the Ptolemaic system), and the more intimately these enter into the life of man, the more important do they become. For this reason only those units which depend upon the sun have asserted themselves in our calendar, those depending upon the moon having been dropped, except for the movable paschal term, which has been kept on religious grounds. The units are the year, the month, and the day. Other units more convenient for time-reckoning play no part in the arrangement of the calendar since they are without importance for practical life. *The day* (= 24 hours, *νυχθήμερον*) is determined from the apparent motion of the heavenly bodies about the earth, which is caused by the rotation of the earth on its axis; but since the sun also, on account of the annual revolution of the earth about it, runs through the zodiac in an opposite direction to its daily movement and completes the circle of the ecliptic in a year, a day will be a little longer than a complete rotation of the earth. Or to put it otherwise: — The time between two successive upper culminations of a star, i. e. between the moments at which the star passes through

the meridian-line of one and the same place (= attains the zenith), represents an axial rotation: that is a *stellar day*. The time between two successive culminations of the sun is, on account of the annual motion of the sun (really that of the earth), 3 min. 56.5 secs. longer than a stellar day: that is a *solar day*. The number of stellar days in a year is greater by one day than the number of solar days. The stellar day does not follow the variations of light and darkness and therefore does not enter into the calendar. The difference between the actual solar day, which is of slightly varying length, and the mean solar day abstracted from it for the purposes of our clock-regulated time-reckoning has no significance for antiquity. The second unit determined by the sun is the *year*, the period of a revolution of the earth about the sun. In relation to the apparent motion of the sun it may be defined as the time which the sun takes to come back again to the same fixed star. This is a *stellar* or *sidereal year*, the length of which amounts to 365 days 6 hrs. 9 min. 9.34 secs. The *tropic year* is the time which the sun takes to come back to the crossing point of the equator, viz. the vernal equinox. This is the natural year. Its length varies a little; it is about 20 minutes shorter than the stellar year. The *lunar* or *moon-month* is determined from the visible phases of the moon. This term will be used only when it is necessary to make an express distinction between the lunar and our Roman month; the latter is a conventional subdivision of the year which has nothing to do with the moon, and has the name 'month' only because it historically arose from the lunar month and in its duration comes fairly near the latter. But when in relation to antiquity — apart from Rome and Egypt — we speak of months, lunar months are as a rule to be understood. The moon revolves around the earth twelve times a year and a little more: consequently it moves backwards in the zodiac much more rapidly than the sun. The interval between two successive moments at which the moon culminates at the same spot at the same time as one and the same star is a *sidereal month* (cp. the sidereal year); its length is 27 days 7 hrs. 43 min. 11.42 secs., but it does not follow the phases of the moon

and is therefore of no consequence for the calendar. The phases of the moon are dependent upon the position of the moon in relation to the sun and the earth. When the three bodies are in a straight line (or rather in a plane perpendicular to the plane of the ecliptic) in such a way that the earth is in the middle, the side of the moon turned towards the earth is completely illuminated and we have full moon: when the moon is in the middle, the side turned towards the earth is completely overshadowed, and that is new moon. In between lie the separate phases of the waxing and waning moon. The *synodic month* is the interval between two new moons and comprises on an average 29 days 12 hrs. 44 min. 2.$_{98}$ secs. This is the true lunar month: other varieties of month are of no importance for us.

The risings and settings of the stars. It has already been remarked that the sun in the course of a year runs through the zodiac backwards, so that one particular star culminates 3 min. 56 secs. earlier every day. Hence it is evident that if we indicate the exact interval of time between the culmination of the sun and that of one particular star, or name the star with which the sun precisely culminates, we can determine the day of the solar year. This is the principle of one method of computing time which was very common among ancient and primitive peoples, but has entirely dropped out of use in modern times owing to our paper calendar. The stars are so to speak the stationary ciphers on the clock-face and the sun is the hand. In practice we naturally have to do not with the invisible culmination of the stars but with the position of the sun and certain neighbouring stars on the edge of the horizon, whereby the matter becomes more complicated on the astronomical side. For this observation the so-called circumpolar stars are singled out, that is to say the stars situated so near the pole that they do not set (e. g. the Great Bear). If the star rises or sets simultaneously with the rising of the sun, this is called the *true cosmic rising* or *setting*. If the star rises or sets simultaneously with the setting of the sun, this is termed the *true acronychal rising* or *setting*. These risings and settings of the star are not visible, since the sun hides them by its

light: the rising and setting are perceptible only when the star stands at some distance from the sun, i. e. only the so-called apparent rising and setting are practically observable. We have already seen that the sun every day drops nearly 4 minutes behind a certain star. Assuming that sun and star rise simultaneously on one day (true cosmic rising), then after a few days have passed -- the period varying somewhat according to the latitude of the place of observation, the time of the year, the size and place of the star — there will come a day on which the star rises so early that it is visible in the morning twilight, immediately before the sun appears. This is the *heliacal* or *morning rising*. From this day the star will rise earlier and earlier, and will therefore remain visible for a longer and longer period. In the course of half a year, commonly a little sooner or later, the time of rising will have been pushed so far back that it will take place in the evening twilight; when it is pushed still farther back the rays of the setting sun eclipse the star and its rising is no longer visible. The last visible rising of the star in the evening twilight is the *apparent acronychal* or *evening rising*. After a few more days the star goes so far back that it rises at the very moment in which the sun sets — the true acronychal rising. The rising, which is advanced constantly further into the light of day, is no longer visible, but on the other hand we now see the setting of the star. If it is assumed that the star is situated on the western horizon, i. e. sets, when the sun is on the eastern horizon, i. e. rises — and incidentally it is to be noted that this position, when the star is not situated in the ecliptic, may be divided by an interval of a larger or smaller number of days from the opposite position, viz. star on the eastern, sun on the western horizon — this is the true cosmic setting. The star moves forward, i. e. its setting takes place earlier in the morning, and after a few days it will be noticed in the morning twilight immediately before it sets, and this is the first visible setting in the morning twilight, the *apparent cosmic* or *morning setting*. From this day the setting moves further and further forward into the night and approaches the evening twilight. At length it will be so near sunset that the star no longer

sets in the night but in the evening twilight. The last visible setting of the star in the evening twilight is the *heliacal* or *evening setting*. After a few days the star has approached still nearer to the sun: both set at the same moment, the true cosmic setting. If the star stands in the ecliptic, the true cosmic setting coincides in date with the true cosmic rising, otherwise these are divided by a greater or smaller number of days (see above). As the star moves on, a heliacal rising follows again, and so on. Between the day of the heliacal setting and that of the heliacal rising the star is invisible, since it stands so near the sun that it is eclipsed by the sun's rays. It has already been remarked that we can determine the day of the year by indicating the true rising and setting of a star at a certain spot. As far as the apparent rising and setting are concerned this indication can only be approximate, since the visibility of a star depends on several variable factors — the size of the star (because a smaller star, in order to be visible, must move farther from the sun than a brighter one), the transparency of the atmosphere, the keenness of vision of the observer, the geographical latitude of the place of observation (since the farther north or south the sun is, the more slowly, because more obliquely, will it sink below the horizon). In this latter respect, for instance, there is a perceptible difference between Rome and Egypt. Only an approximate indication of time, therefore, can be derived from the rising and setting of the stars".

The phases of the climate and of plant and animal life cannot be particularly described, since they naturally vary so much in different countries. It can only be remarked that though they depend upon the course of the sun, yet in certain cases, owing to the special climatic conditions of the individual years, they may be to some extent advanced or retarded, and further that the climatic phenomena of many parts of the earth, especially in the Tropics but also in the Mediterranean countries, recur with a far greater regularity than in our northern climes, which are subject to such uncertain weather. Instances are the trade-winds and monsoons, the dry and the rainy seasons.

Upon the above-mentioned units the system of time-reckoning

will be based. The days are joined into months and the months into years; only more rarely are the seasons interposed as regular units of time. The system is like a chain the links of which run into one another without gaps: each link is equivalent, or as nearly as possible equivalent, to every other link of the same class, and therefore need only be given a name and counted, not necessarily conceived in the concrete, although this is not excluded. This is the only genuine system, a system of *continuous time-reckoning*, which excludes all gaps in the chain and all links of indeterminate length. The relation between the larger and the smaller units may be treated in various ways, chiefly on account of the fact that the smaller units do not divide exactly into the larger. Sometimes the smaller units may be fitted into the larger as subdivisions of the latter, so that they constitute the links of the chain formed by the larger unit. The inequality referred to shews then that the units vary to some extent in number or size (year of 365 or 366 days, of 12 or 13 lunar months, lunar month of 29 or 30 days). In that case the beginnings of the larger unit and of the first of the smaller units coincide. Thus in our year New Year's Day and the first day of the first month coincide, but the length of the months varies somewhat. This is an inheritance from the lunisolar year, in which also New Year's Day and the first day of the first month coincided and the length of the month varied between 29 and 30 days, but in addition the year varied between 12 and 13 months. This mode of reckoning, in which the smaller units are contained in the larger as subdivisions of them, will be termed the *fixed* method.

But where the smaller units do not exactly divide into the larger, both may also be counted independently of one another without being equalised. A case in point is our week, which is reckoned without reference to the year, so that every year begins with a different day of the week. This method of reckoning we shall term the *shifting* method. It is less systematic than the fixed method, and we shall therefore expect to find it play a greater part in earlier times than at the present day.

The system of time-reckoning, the continuous counting of the time-units, represents the final point of the development. It is our object to investigate the preceding stages, both systematic and unsystematic. Certain important ideas which frequently recur must however first be clearly set down. The *time-reckoning* in the proper sense of the term is preceded by *time-indications* which are related to concrete phenomena of the heavens and of Nature. Since these indications depend upon the concrete phenomenon, their duration fluctuates with the latter, or rather the duration does not stand out by itself but the phenomenon as such is exclusively regarded: the time-indication is not durative, like the link in any system of time-reckoning, but indefinite, or, to borrow a grammatical term, aoristic. And setting aside these finer distinctions we also find that the phenomena to which the time-indications are related are of fluctuating and very unequal duration. Since the duration is indeterminate and fluctuating, and the time-indications are not limited one by the other but overlap and leave gaps, they cannot be numerically grouped together. Here we ought really to speak not of a time-*reckoning* in the proper sense, but only of time-*indications*. But since the word 'time-reckoning' has become naturalised, this method may be described as the *discontinuous* system of time-reckoning, because the time-indications do not stand in direct relation to other time-indications but are related only to a concrete phenomenon, and through that to other time-indications, so that they are of indeterminate length and cannot be numerically grouped together.

If the number of dawns, suns, autumns, or snows that has passed since a certain event took place, or will elapse before a certain event is to take place, be indicated, the time that has passed or is to pass will be defined, because the dawn or the sun recurs once in the day, and an autumn or a snow, i. e. winter, once in the year. This is the oldest mode of counting time. It is not the units as a whole that are counted, since the unit as such had not yet been conceived, but a concrete phenomenon recurring only once within this unit. It is the

pars pro toto method so extensively used in chronology, and by this name we shall call it [1].

Since it must now be regarded as the natural course of development that the systematic has gradually arisen out of the unsystematic, and that the indication of concrete phenomena following one another in the regular succession of Nature has preceded the abstract numerical indication of time offered by our calendars, the origin of the time-reckoning must be sought not in any one system, however simple, but in the discontinuous or *pars pro toto* time-indications which are related to concrete phenomena.

Our task is now to make clear the nature of these discontinuous and *pars pro toto* time-indications, since from them proceeds, as order is ever evolved out of chaos, the continuous time-reckoning, the calendar.

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[1] In Swedish (or German) I should use the word *punktuell* to denote this mode of time-reckoning, since the calculation is based upon a *punctum*, a single point, not upon the whole unit of time. Unfortunately the word 'punctual' has quite another sense in English.

CHAPTER I.

THE DAY.

For primitive man the day is the simplest and most obvious unit of time. The variations of day and night, light and darkness, sleeping and waking penetrate at least as deeply into life as the changes following upon the course of the year, such as heat and cold, drought and rainy seasons, periods of famine and plenty. But for the primitive intellect the year is a very long period, and it is only with difficulty and at a later stage that it can be conceived and surveyed as a whole. Day and night, on the other hand, are short units which immediately become obvious. Their fusion into a single unit, the day of 24 hours, did not take place till later, for this unit as we employ it is abstract and numerical: the primitive intellect proceeds upon immediate perceptions and regards day and night separately.

Evidence for this fact is furnished by most languages, which are as a rule without any proper term for day and night together, the circle of 24 hours. In writing English one sadly misses the Swedish *dygn*, which has exactly the required significance. The German *Volltag* is an artificial and not very happy compound. The Greeks also formed a learned and rare (though good) compound, *νυχθήμερον*. The usual method is to make use of a term according to the *pars pro toto* principle. This principle, which we meet here at the outset and shall come across more and more frequently in the course of the following pages, is of great importance for the development of time-reckoning since it shews how the original time-indication is discontinuously related to a concrete phenomenon, and only slowly and at a later period develops into a continuous numerical unit of time.

To describe the period of 24 hours, regarded as a single unit for purposes of calculation, most modern and also the ancient tongues employ the term that denotes its light part, i. e. 'day' etc. Primitive peoples have no term to express this idea and must describe the period by means of expressions equivalent to 'day and night', e. g. 'sun-darkness' (Malay Archipelago) [1], 'light and darkness' (Yukaghir in N. E. Asia) [2]. The day is sometimes described by the concrete phenomenon which it brings, namely the sun. The Bontoc Igorot of north Luzon have the same word for sun as for day, *a-qu*, and the time is reckoned in suns [3]. The Comanche Indians reckon the days in 'suns' [4], and in an Indian hieroglyph from the northern shores of Lake Superior the duration of a three days' journey described is expressed by three circles, i. e. three suns [5]. The western tribe of the Torres Straits reckons time in 'suns', i. e. days [6]. We may compare the well-known primitive idea that the sun originates afresh for every new day. The same thing is found in the language of signs. La Billardière in the year 1800 relates of the very low Tasmanians, now long since extinct, that they had some idea of regulating time by the apparent motion of the sun. In order to inform him that they would make a journey in two days, they indicated with their hands the diurnal motion of the sun and expressed the number two by as many of their fingers. This, he asserts, is the only reference that can be found to any knowledge of the movements of the heavenly bodies [7]. So also according to Homfray the natives of the Andamans describe a day by making a circle with the right arm, i. e. a revolution of the sun. We may compare the indication of the time of day by pointing with the hand to the position of the sun, with which we shall shortly have to deal. It is not improbable that the designation of the day by means of an indication of the course of the sun arose in the first place from the indication of the position of that planet. The same method of expression is found in the classical languages as a poetic or hierarchical

[1] Snouck Hurgronje, I. 201. [2] Jochelson, *Yukaghir* p. 42. [3] Jenks, p. 219. [4] Schoolcraft, II, 129. [5] *Ibid.* I, 57 B. [6] Haddon, p. 303. [7] Ling Roth, p. 133.

archaism [1], and also in medieval Latin. But *ἥλιος*, *sol*, is also used to denote the yearly revolution of the sun, i. e. a year, and the year is denoted by *φάος*, *lux*. Still more striking and more significant for the discontinuous method of reckoning is the Homeric use of *ἠώς*, 'dawn', instead of day, e. g. "this is the twelfth dawn since I came to Ilion", [2] "this is the twelfth dawn he lies so", [3] and elsewhere. Aratus follows the Homeric use [4]. The nature of this *pars pro toto* reckoning will be further explained in the chapter dealing with the year.

The counting of the days from the dawns is unique, and the counting from the day-time is comparatively rare: the Indo-European peoples of olden times, and indeed most of the peoples of the globe, count the days from the nights. For this it will be sufficient to quote Schrader's statement: — "Moreover it can hardly be necessary to give evidence for this well-known custom of antiquity. In Sanskrit a period of 10 days is called *daçarâtrá* (: *râtrî* = 'night'); *nîçanîçam*, 'night by night' = 'daily'. 'Let us celebrate the old nights (days) and the autumns (years)", says a hymn. In the Avesta the counting from nights (*xsap, xsapan, xsapar*) is carried out to a still greater extent. As for the Germanic peoples, among whom Tacitus had already observed this custom, [5] we constantly find in ancient German legal documents such phrases as *sieben nehte, vierzehn nacht, zu vierzehn nachten*. In English *fortnight, sennight* are in use to-day. That the custom existed among the Celts is proved by Caesar, *De Bell. Gall.* VI, 18, *spatia omnis temporis non numero dierum, sed noctium finiunt* ('they define all spaces of

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[1] See further Usener, *Götternamen*, p. 289. E. g. Pindar, *Ol.* XIII, 37, *ἀελίῳ ἀμφ' ἑνί* ('in one day'), Euripides, *Helena* 652, *ἡλίους δὲ μυρίους μόγις διελθών* ('with difficulty passing through thousands of suns'), and in a sacred regulation *ἐᾶσαι οὕτως ἔστε κα τρεῖς ἅλιοι γένωνται* ('to leave so until three suns have passed'), Blinkenberg, *Die lindische Tempelchronik*, p. 38, Part D, l. 72, (Bonn, 1915) etc. In Latin still more frequently, e. g. Silius, *Punica*, III, 554, *Bis senos soles, totidem per vulnera saevas emensi noctes, etc.* [2] Il. XXI v. 80 *ἠὼς δέ μοί ἐστιν ἥδε δυωδεκάτη ὅτ' ἐς Ἴλιον εἰλήλουθα.* [3] Il. XXIV v. 413 *δυωδεκάτη οἱ ἠως κειμένῳ.* [4] Otherwise, but in my opinion erroneously, G. Bilfinger, *Der bürgerliche Tag*, p. 35. [5] Tacitus, *Germ.* 11, *nec dierum numerum sed noctium computant.*

time not by the number of days but by the number of nights')." The Arabians have the same practice. They say 'in three nights', 'seventy nights long', and date e. g. 'on the first night of Ramadan', 'when two nights of Ramadan have gone', or 'are left' [1]."

For primitive and barbaric peoples the evidence is equally abundant. The Polynesians in general counted time in nights. Night is *po*, to-morrow is *a-po-po*, i. e. the night's night, yesterday is *po-i-nehe-nei*, the night that is past [2]. The New Zealanders, in former times, had no names for days, but only for nights [3], and so with the inhabitants of the Sandwich Islands — and the same is certainly true of the Polynesians as a whole, since they describe the 'days', or rather the nights, by the phases of the moon. The Society Islanders reckon in nights; to the question 'How many days?' corresponds in their tongue 'How many nights?' [4] So also do the inhabitants of the Marquesas [5]. In the Malay Peninsula periods exceeding a fraction of a day are reckoned in nights [6]. Among the Wagogos of German East Africa the phases of the moon and the number of nights serve as more exact determinations of time. The third night after the appearance of the moon, for example, is the day following the third night after the moon's appearance [7]. Sometimes they say 'day and night' when they wish to describe the full day of 24 hours. Occasionally they say that they have worked so many days, with reference to the day-time only [8]. Except in the case of this tribe I have found no notes on the African peoples; little attention seems to have been paid to the point in their case. But the material for America abounds. The Greenlanders reckon in nights [9], though certainly we are not told how those who live north of the Polar Circle reckon in summer. So do the Indians of Pennsylvania [10], the Pawnees, who often made use of notches cut in a stick or a similar device for the computation of nights or even of months and

[1] Schrader, II. 235; Ginzel, I, 243; A. Fischer, p. 744. [2] Fornander, I, 122. [3] Taylor, p. 364. [4] Ellis, *Polyn. Res.*[3] I, 88. [5] Mathias G., p. 210. [6] Skeat and Blagden, I, 393. [7] Claus, p. 38. [8] Cole, p. 323. [9] Cranz, I, 239. [10] Heckewelder, p. 523.

years [1], and the Biloxi of Louisiana [2]. Usually however the night is denoted not by this word but by 'sleep', 'sleeping-time'. Of the Kiowas it is expressly stated [3] that they reckon the length of a journey in 'darks', *kon*, i. e. nights, and not in 'sleeps'. If the question of the distance of any place arises the answer is 'so many darks'. It may even be doubted whether 'sleep' is not sometimes translated 'night' by the reporters. The Dakotas say that they will return in so many nights or sleeps [4]. Among the Omahas the night or sleeping time marked the division of days, so that a journey might be spoken of as having taken so many sleeps [5]. The Hupas of Arizona [6], the tribes of the North-East [7], and the Kaigans of the North-West [8] also reckon in sleeps. This mode of reckoning is therefore the common one, that of the Comanches in suns is an exception. Finally the natives of Central Australia also count time in 'sleeps' [9].

To reckon in nights is therefore the rule among the primitive Indo-European peoples, the Polynesians, and the inhabitants of North America. For Asia, which however is not so important for primitive time-reckoning on account of the old and far-reaching influence of civilisation in that continent, for Africa, and for S. America evidence is wanting or is forthcoming only in isolated instances. The reason probably is that in these continents also time is really reckoned in nights, and our informants have not noticed the agreement. This however is an *argumentum ex silentio*. Be that as it may, the fact remains that at least half the globe reckons the days in nights.

The current explanation of this striking fact is given by Schrader thus: — "Since the chronometer of primitive times is the moon and not the sun, the reason for counting in nights instead of days becomes almost self-evident" [10]. This statement is *a priori* not perfectly correct, inasmuch as there is and can have been no people that has not observed the daily course of the sun as well as the monthly phases of the moon: as chronometer neither of the two bodies is older than the other. The

[1] Dunbar, p. 1. [2] Swanton, p. 339. [3] Mooney, p. 365. [4] Riggs, p. 165. [5] Fletcher and La Flesche, p. 111. [6] Powers, p. 77. [7] Carver, p. 177. [8] Radloff, p. 308. [9] Spencer and Gillen, *Centr. Austr.*, pp. 25 ff. [10] Schrader, II, 235.

difference lies in the development of the time-reckoning. In point of fact an inner connection seems to exist between the counting of the days in nights and the designation of the days, or rather the nights, of the month according to the phases of the moon, to which we recur further on. Even such low races as the tribes of Central Australia already have names for the phases of the moon, from which they reckon time [1], but unfortunately we are not told how many. The Polynesians have very elaborately developed these, so that every day has its separate name. The Wagogos also use the phases of the moon as indications of time. The Arabs speak of ten phases of the moon, combining three days under each name. The Indians know the phases of the moon, but seem to have named and made use of them only roughly: the only tribe that possesses a list of the names of the days of the moon-month is the Kaigans [2], and unfortunately this list is incomplete. Moreover there are no indications that the primitive Indo-European peoples distinguished the phases of the moon otherwise than roughly. The finer distinction and nomenclature of the moon-phases, so that in the end each day comes to have its separate name, is clearly a very far advanced special development: the use of the word 'night' to express the period of 24 hours is much older. A causal connection, such as Schrader and others have maintained, must lie in the fact that the period of 24 hours is named after the phases of the moon and consequently the day itself is reckoned in nights. But this is only a comparatively isolated and advanced development, against which must be set the fact that the Indians and so primitive a people as the Australians use not the word 'night' but 'sleep', which has nothing to do with the moon.

The explanation must therefore be sought elsewhere, and is one which also applies to the use of the word 'winter' for year etc. Primitive man knows only concrete indications of time, and in reckoning prefers to use a concrete and clearly visible point of reference. The complete day of 24 hours is unknown to him and so he *must* reckon according to the principle of *pars pro toto*, and as a matter of fact it is possible

[1] Spencer and Gillen, *Centr. Austr.*, pp. 25 ff. [2] Radloff, p. 308.

to reckon just as well from a part of the whole as from the whole itself, provided that the part chosen is one that only recurs once every day. The day itself, with its various occupations, offers no such point of reference unless the reckoning is based upon the daily appearance of the sun, which is also actually done in certain cases. However in the daily course of the sun, as we have already seen, two features, its duration and the changing position of the sun, stand out prominently: but it is easier to reckon from points than from lengths, which divert the attention from the number. Now the sleeping-time is necessarily bound up with each day, yet it has no separate parts, or acquires them only later among certain peoples. The time between going to sleep in the evening and waking in the morning appears as an undivided unit, a point. It offers for reckoning a convenient basis in which no mistake or hesitation is possible such as can occur in the various occupations that fall within the period computed. The method of reckoning in nights is merely an outcome of the necessity for a concrete unmistakable time-indication: it is a typical example of the *pars pro toto* principle and time-reckoning, which, on the psychological grounds just mentioned are especially favoured in the counting.

For the indication of a point of time within the day the reference to the course of the sun is the means that lies nearest to hand, and the indication can indeed be given quite concretely by means of a gesture in the direction of the heavens. This language of signs is especially common in Africa. The Cross River natives of Southern Nigeria indicate the time by pointing to the position in the heavens which the sun occupies at that time of the day [1]. When someone asked a Swahili what time it was, he answered, "Look at the sun", although this tribe knew other ways of indicating time [2]. The Wagogo in order to shew the time of day indicate with the hand the position of the sun in the heavens [3]. In Loango the people indicate the time satisfactorily enough from the motion of the sun, in divisions of two hours, by dividing the vault of the sky with

[1] Partridge, p. 244. [2] Velten, p. 353. [3] Claus, p. 38.

outstretched arm, often using both arms as indicators [1]. Moreover most peoples have descriptive expressions for parts of the day, as for instance the inhabitants of the Lower Congo [2], the Masai of East Africa, who estimate the time of day from the position of the sun [3], and the Hottentots, who express with certainty and clearness both points and duration of time by referring to the position of the sun [4]. In Dahomey the natives tell the hours by means of the sun; they say that the sun is here or there, in order to give the time of day [5]. The Caffres are able to give the exact time of day by pointing with outstretched arm to the spot at which the sun appears at the time they wish to indicate. So, for example, when the Caffre wishes to shew that he will come at two o'clock in the afternoon of the next day, he will say, "I will be here to morrow, when the sun is there" — pointing to the position occupied by the sun at 2 p. m. [6]. The Waporogo of German East Africa estimate the divisions of the day from the position of the sun, which they indicate with outstretched arm. When the arm is vertically raised, that means 12 o'clock noon, and the other hours of the day they are able to give with a sure instinct by means of a greater or lesser inclination of the arm towards the body, corresponding to the position of the sun [7]. In other parts of the world we find the same thing. Thus in the New Hebrides the hours of the day are indicated by pointing with the finger to the altitude of the sun [8]. If a native of Australia is asked at what time anything took place or is going to take place, his answer will take the form of pointing to the position which the sun occupied or will occupy in the sky at that particular time [9]. The Bontoc Igorot of Luzon point to the heavens in order to indicate the position the sun occupied when a particular event occurred [10]. The Kanyans of Sarawak, if asked at what time anyone will arrive, point to the sun and say, "When the sun stands there" [11]. In the Dutch East Indies the time of day is given from the position of the sun [12].

[1] *Loango Exp.*, III: 2,140. [2] Hammar, p. 156. [3] Merker, p. 153. [4] Schulze, p. 373. [5] Foa, p. 119. [6] Alberti, p. 69. [7] Fabry, p. 223. [8] Oliveau, p. 343. [9] Spencer and Gillen, *Across Austr.*, II, 270. [10] Jenks, p. 219. [11] Hose, p. 169. [12] Wilken p. 200.

The inhabitants of Java divide the day into ten natural but vague and unequal subdivisions, and for astrological purposes the day of 24 hours is divided into five parts. They also determine the time of day by the length of the shadow and by the working-time, but the most common method is by pointing to the situations of the sun in the heavens, when such and such an event took place [1]. In order to indicate the time the natives of Sumatra also point to the height in the sky at which the sun stood when the event of which they are speaking occurred [2]. The natives of the western tribe of the Torres Straits, though they have learned to tell the time from the clock, also know how to give it very accurately by observing the height of the sun [3]. The Tahitians determine the six parts of their day from the sun's altitude [4]. Among the Omaha Indians the sun indicates the time of day. A motion towards the zenith meant noon, midway between the zenith and the west, afternoon, and midway towards the east, forenoon [5]. The Karaya of Central Brazil divide up the day according to the position of the sun. Indications of time are given by pointing with the hand to the place occupied by the sun at the time in question [6].

This method of indicating the time of day is quite satisfactory, especially in the tropics and for primitive needs, and only more rarely does it give place to other methods, the chief of which is the observation of the length of shadows. The Javanese know this latter method but do not often use it. In their old writings we find a traveller described as setting out on his journey or arriving at the end of it when his shadow was so many feet long [7]. The Masai usually estimate the time of day from the position of the sun, but more rarely from the length of the shadows [8]. When the shadow measures nine feet, the Swahili say, "It is 9 o'clock *(sic!)*" [9]. To indicate the time of day or to represent a distance the Cross River natives use the length of shadows. They have however in most of their houses a curious species of sun-dial, a plant about 50 cm. high, with violet-white flowers. The flowers gradually begin to open

[1] Crawfurd, I, 287 f. [2] Marsden, *Sumatra*, p. 194. [3] Haddon, p. 303. [4] Forster, pp. 441 ff. [5] Fletcher and La Flesche, p. 111. [6] Krause, p. 339. [7] Crawfurd, I, 287. [8] Merker, p. 153. [9] Velten, p. 333.

at sunrise, by noon they are wide open, and they gradually close again between noon and sunset. One of these plants is placed in every garden and enclosed within little stones [1]. To the south of Lake Nyassa the time of day is reckoned either from the position of the sun or from the length of the shadow thrown by a stick, *nthawe* [2]. The Society Islanders among their numerous expressions for the time of day include two which have reference to shadows, 'the shadow as long as the object', 'the shadow longer than a man' [3]. The Benua-Jahun, a primitive tribe of the Malay Peninsula, indicate the progress of the day by the inclination of a stick. Early morning is represented by pointing a stick to the eastern horizon. Placed erect it indicates noon, inclined at an angle of about 45° to the west it corresponds nearly with three o'clock, and so on [4]. This practice is doubtless connected with the common use of a stick in the Indian Archipelago for observations of time, and is by no means primitive. The ancient Athenians seem to have indicated time by measuring off with the foot the length of the shadow cast by their bodies upon the level ground before them as they stood. At all events the length of shadows served to indicate time, cp. Aristophanes, *Ekkles.*, 652, "when the staff is ten feet, to go perfumed to dinner" [5]. The gnomon which, according to Herodotus II, 109, the Greeks borrowed from the Babylonians was an upright stick the shadow of which was measured: it was also an important instrument for astronomical observations [6]. Here however we are already at a highly developed stage and know nothing about the origins.

The indication of time from the position of the sun is really only satisfactory in the tropics, where the sun always stands very high and the length of its daily course is not exposed to too great variation. Where the sun is much lower in winter than in summer, and the length of the day varies greatly at different times of the year, the method ceases to be practicable. If descriptive expressions of one kind or another are

[1] Mansfeld, p. 244. [2] Stannus, p. 288. [3] Wegener, p. 146. [4] Skeat and Blagden, I, 393. [5] *ὅταν ᾖ δεκάπουν τὸ στοιχεῖον, λιπαρῷ χωρεῖν ἐπὶ δεῖπνον.* [6] G. Bilfinger, *Zeitmesser*, p. 19; art. *Horologium* in Daremberg and Saglio, *Dictionnaire des Antiquités.*

not resorted to, other means must be found. Above all it is important to determine the fixed point which divides the day into two parts, i. e. noon. In the living-room of the houses of the Scanian peasants, which were always built 'according to the sun', i. e. facing east and west, there was in the southern window-sill, beside the middle shaft of the frame, a line which was called the 'noon-line'. When the shadow of the shaft fell parallel with this line it was noon. This device is not exactly primitive, since windows in the room, more particularly in the wall, belong to a quite advanced stage of civilisation. But on the other hand such customs as the determination of noon and other moments of the day from the position of the sun above certain points on the horizon — elevations and hills — are old. In Iceland the divisions of the day were, and still are, determined from the visible course of the heavenly bodies. The people imagined that the sun in the course of a day and a night ran through the eight equal regions of the heavens (*ættir,* sing. *ætt*). The time of day was determined from the position of the sun above the horizon by the selection in every house of certain outstanding points within the range of vision to serve as 'day-marks' (*dagsmǫrk,* sing. *-mark*) — where these were lacking, small piles of stones were erected for the purpose — so that when the sun stood above one of these marks a certain time of day was given. The most important times thus determined were *rismál* or *miðr morgin* (6 a. m.), *dagmál* (9 a. m.), *hádegi* (12 o'clock noon), *miðmundi* (1.30 p. m.), *nón* (undoubtedly originally called *undorn* and also *eykt,* 3 p. m.), *miðr aptann* (6 p. m.), and *nattmál* (9 p. m.). These indications in hours are however only approximate, since the time varies according to the position of the place in question [1]. The word *eykt* really designates any of these approximately three-hour divisions; but since the length of the day varies enormously so far north, the business of everyday life leads to an attempt at systematising, e. g. *rismál* = 'the time of rising'. The spot which the sun has reached at one of these divisions is therefore called *dag-málastað, nónstað, eyktarstað* etc. This mode of determining

[1] Paul, III, 447. See further Finn Magnusson.

time must be old since it is also found in Scandinavia, where it has given names to many mountain-peaks. In Baedeker I have only noticed: — *Middagsfjället* in Jämtland, *Middagshorn* in Norangdal, *Middagshaugen* in Aardal, Sogn, *Middagsnib* in Oldendal in the Nordfjord district, *Middagsberg* on the Nærøfjord in Sogn, *Nonsnib* above Loen Water in Nordfjord, *Solbjørgenut* in the Nærøfjord, Sogn. From Fritzner's Old Norwegian Lexicon (s. v. *eyktarstað*) I take: — *Durmaalstind, Rismaalsfjeld, Nonsfjeld, Natmaalstinden, Middagsfjeld* in Tromsö 'amt' and in Finnmarken, *Eyktargnipa* and *Undornfjeld* in Mule Syssel in Iceland; the peak of the latter lies in the *nonstað*. Such names are common in Norway. In Sweden there are further: — *Middagsberget* in Dalecarlia = Gesundaberget, just south of Mora; the name is found again in Härjedalen, in addition to *Nonsberget, Nonsknätten* and *Middagshognan*. Lidén [1] instances similar names in S. Sweden and in England, and also those formed with *mosse,* 'swamp', *vik,* 'bay', and *åker,* 'field'. It is easy to understand why *middag,* 'noon', everywhere predominates as a nomenclator. The Lapps also indicate time by the position of the sun in relation to the surrounding natural objects [2].

The gestures may be accompanied by descriptive expressions, as among the negroes, or replaced by them, which seems to be the rule among other peoples. The latter practice offers the further advantage of being available in the nighttime, when it is necessary to mention a point of time after dark. The Kayans denote the time of day by pointing to the position of the sun, but for morning and evening they also use the expressions 'when the sun has risen' or 'set' [3]. Expressions for the most important divisions, sunrise and sunset (= morning and evening) and noon, are found among all peoples. Even the tribes of Central and Northern Australia have words e. g. for evening and for morning before sunrise [4]. The richness of the terminology however varies exceedingly. The Indians divide the day into three or four rough divisions only. The

[1] *Arkiv för Nord. Filologi, 23,* 1907, pp. 259 ff. [2] Drake, p. 276. [3] Hose, p. 169. [4] Spencer and Gillen, *Northern Tribes,* p. 25; Spencer, pp. 444 ff.

Seminole of Florida divided up the day by terms descriptive of the positions of the sun in the sky from dawn to sunset [1]: unfortunately we are not told what these words were or how many of them existed. Among the Hopi of Arizona there is every evidence that the time of day was early indicated by the altitude of the sun [2]. The Omahas know no smaller divisions of the day than morning, noon, and afternoon, to which certainly must be added the transitional periods of sunrise and sunset [3]. The Occaneechi of Virginia measure the day by sunrise, noon, and sunset [4]. The Algonquins of the same province mention the three times of the rise, power, and lowering of the sun [5]. Many tribes however had four divisions [6], e. g. the Natchez of Louisiana, who divided the day into four equal parts: half the morning, until noon, half the afternoon, until evening [7]. But there is also a richer terminology, e. g. the Kiowa words for dawn ('first-light'), sunrise (lit. 'the-sun-has-come-up'), morning (lit. 'full-day'), noon, earlier afternoon until about 3 o'clock, late afternoon, evening (lit. 'first-darkness') [8]; and in particular among the Statlumh of British Columbia: dawn ('it-just-comes-day'), early morning ('just-now-morning'), morning light ('just-see-things'), full light ('just-now-day'), sunrise ('outside-sun'), early morning (midway between sunrise and noon), noon (up till about 2 p. m.), middle of the afternoon, about 4 p. m., 'three-fourths-of-the-day have-gone', 'sun-sitting-down', 'the-sun-gone', 'evening-creeping-up-the-mountain' (this refers to the line of shadow on the eastern mountains), 'reached-the-top', i. e. the line of the shadows, twilight, 'getting-dark', night, darkness, pitch dark [9].

Of the Indians of S. America little is reported. 'The-sun-is-perpendicular' was the expression for noon on the Orinoco [10]. The Indians of Chile had words for morning twilight, dawn, morning, noon, afternoon, evening, evening twilight, night, and midnight [11].

The terminology for the parts of the day is especially

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[1] Mac Caulay, p. 525. [2] Fewkes, p 260. [3] Fletcher and La Flesche, p. 111. [4] Beverley, p. 4. [5] *Ibid.* p. 182. [6] *Handbook,* p. 189. [7] Du Pratz, I, 223. [8] Mooney, p. 365. [9] Hill Tout, p. 155. [10] Gilij, II, 12. [11] Molina, pp. 139 ff.

rich in Africa, a fact which is connected with the refinement of the observation of the sun's position resulting from the custom of indicating this by a gesture in the direction of the heavens. Such simple indications as those of the Babwende for noon, 'the-sun-over-the-crown-of-the-head', and for midnight, 'the-silence-of-the-land' [1], are rare. A number of elaborate time-indications are as a rule employed. The Wadschagga say at six o'clock in the morning 'the sun rises', at twelve o'clock 'the sun rests on his cushion' (like a tired porter), from twelve to one 'the sun goes straight on', about two it 'bows', about six it 'falls down', or 'spreads its arms out', like a man in the act of falling [2]. The terms used by the Bangala are: — about 2 a. m., the lying fowl; 3, the lying bird; 4, the first fowl; 4—5, the sun is near; 5, not translated; 5.30—6, the dawn; 6, the sun is come; 6.15—7, *ntete;* 12 noon, 2—3, 3—4, not translated; 6, the fowls go in, or the sun enters, or the sun darkens; 6.30, twilight finishes; 11—12, one set of the ribs or one side of a person, meaning that a person turns from lying on one side over on to the other; 12 midnight, second division or second half [3]. In Bornu the expressions for the time of day are formed by the aid of the word *dinia* = 'world', 'universe', 'sky'. From about 4 to 5 'the world cuts the aurora'; at 6 'the world is light'; at 12 'the sun is in the centre of the world'. Afterwards follow 'it is evening', twilight, night, midnight. Since the people are Mohammedans they also have expressions for the hours of prayer[4]. The expressions used by the Shilluk of the White Nile are translated [5]: — "The first morning, twilight becomes visible, morning dawn, morning, the earth is morning (it is morning) — the difference here is not evident — noon, the sun is in the zenith, the sun begins to sink (afternoon), it is afternoon, the sun is setting, the sun has set, it is night, at night, midnight." The Yoruba divide the day into early morning, morning or forenoon, noon (when the day is 'perpendicular'), shadow-lengthening or afternoon, evening or twilight [6]. The Masai distinguish the following parts of the day: — at 4 a. m. it is 'not-yet-early'; at 5 it is 'early'; somewhat later come dawn,

[1] Hammar, p. 156. [2] Gutmann, p. 241. [3] Weeks, *JRAI, 39,* p. 417. [4] Koelle, p. 284. [5] Westermann, p. 105. [6] Ellis, *Yoruba,* p. 150.

twilight (about 5.30, 'the-sun-is-still-far-off'), and sunrise ('the-sun-shews-himself-a-little' or 'rises'). From 8 to 10 it is 'still-early', towards 11 they say 'the-sun-is-not-yet-perpendicular-overhead', at 12 'the-sun-is-perpendicular-overhead'. The afternoon is usually expressed by 'the-shadow-is-turned-round'. This phrase is often used for the period from 3 to 5 p. m. In particular, 12—2 = 'the-sun-is-broken', 2—4 = 'afternoon-now', 4—6 is evening, 5 = 'the-sun-goes-down', sunset glow = 'the-twilight-follows-the-sun'. With the coming of darkness begins the *tapa,* which lasts until 8 o'clock, when the people usually go to rest [1]. Another authority gives the following list: — Evening, when the cattle return to the kraal just before sunset; night-fall, or the hour for gossip, before the people go to bed about 8 o'clock; then night, midnight, and the time when the buffaloes go to drink (about 4 a. m.), this latter is the hour before the sun rises; then 'the blood-red period' or 'the time when the sun decorates the sky', this is the hour when the first rays of the sun redden the heavens; after that morning, when the sun has risen. There are also hours called 'the-sun-stands-(or is-)opposite-to-one' (midday), and 'the-shadows-lower-themselves' (1—2 p. m.) [2]. The Nandi, north-east of the Victoria Nyanza, divide the day into six parts with separate names: 5—6 a. m., 6—9 a. m., 9 a. m. — 2 p. m., 2—6 p. m., 6—7 p. m., night. They have moreover a highly developed terminology for the hours of the day, to which we shall return later. The Baganda distinguish the following times of day:— night, midnight, cock-crow, early dawn, morning, 'little sun' (early morning from 6 to 9), full or broad daylight (9—2), midday, afternoon, evening [3]. The lower classes sometimes reckon from the meal-times, breakfast at 7 a. m., dinner at noon, and supper at 6 p. m. Women engaged in rough work in the gardens spoke of the time at which such and such an event took place as that of the first or second pipe, the first marking an interval of rest at 8 a. m., the second being smoked when work ceased at 10 a. m. [4]. The expressions for the times of day among the Thonga of South Africa have

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[1] Merker, p. 153. [2] Hollis, *Masai,* p. 332. [3] Roscoe, *JRAI, 32,* p. 71. [4] Roscoe, *Baganda,* p. 38.

been translated and explained as follows: — "The dawn is called *nipandju;* then come *tlhabela sana,* the time when the rays of the sun (*sana*) are piercing; *hisaka sana,* when they are burning; *nhlekani,* the middle of the sky, or *shitahataka,* the maximum point of heat; then *ndjenga* or *lihungu,* the afternoon; the time when the sun goes down *(renga); ku pela* or *ku hlwa,* when it reaches the horizon; and *inpimabayeni,* the twilight, literally 'the time when you do not easily recognise strangers coming to your village because it grows dark' " [1]. It is remarkable here that many indications are given from the increasing heat and not from the position of the sun. The Hottentots distinguish morning and evening twilight, morning brightness, i. e. the time of clear day shortly before sunrise (the native name is given because about dawn it is usually most perceptibly cold), and evening brightness, 'the red twilight'. 'Little children's twilight' was in some places the name given to the time of the first noticeable diminution of light after sunset, in accordance with the belief that at this hour most children were born. Afternoon and morning were only approximate. A distinction was made between evening and late evening, which extended till long after sunset [2]. The author just quoted remarks that in this case one is struck by the fact that while the limits of day and night are elaborately marked out, of the hours of day itself only noon is brought into prominence. The same is the case with most peoples who possess a more highly developed terminology of this nature, and the circumstance is perfectly natural, since the concrete differences in the phenomena of light and of the heavens become so great and so easily visible during the transition from day to night and night to day. As soon as the sun has risen a little in the heavens these differences consist chiefly in the position of the sun and in the increasing heat. Here the language of signs is really more expressive.

The aboriginals of the Andaman Islands have terms for the following times of day: — dawn, the time between this and sunrise, sunrise, the time between sunrise and 7 a. m., morn-

[1] Junod, *Thonga,* II, 282. [2] Schulze, p. 373.

ing (three different expressions), noon, the time from noon to 3 p. m., from 3 to 5, from 5 to sunset, sunset, twilight, from night-fall to midnight, midnight [1]. In Busang (the common commercial language of the Bakau) as spoken by the Mendalam Kayan of Borneo the different times of day are named: — *dow* (day) *bekang* (open, split) = 6 a. m.; *dow njirang* (to shine) *mahing* (powerful) = about 9 a. m.; *dow negrang* (upright) *marong* (real) = about 12 noon; *dow njaja* (great) = about 4 p. m.; *dow lebi* (little) = about 6 p. m. [2] The terms used by the Islamite Malayans of Sumatra are mingled with Arabic loan-words, which I indicate by (Ar.): – 6 a. m. (Ar.) dawn, 9 'half of the rising', 11 'close to noon', 12 'middle of the day', 12—1 p. m. (Ar.), 1—3 'mid-descent', 3 'the time of the long sinking', 4 (Ar.) afternoon, 5.30 'time of twilight', 6 (Ar.) sunset, 8 (Ar.) evening [3]. The Javanese speak of morning, forenoon, noon, afternoon, fall of the day, sunset, evening [4]. The Achenese of Sumatra, who have a fully developed calendar influenced by Arabic, keep the old names for the times of day but with Arabic words and the Moslem hours of prayer intermingled. About 6 a. m. = with the breaking forth of the sun; 7—7.30 = the sun a pole high, referring to the poles used in propelling craft; 9 = rice time, i. e. meal time; 10 = the loosening of the ploughing-gear; 11 = the approaching of the zenith; 12 = the zenith; 12.30 = the falling from the zenith; 1.30—2 = the middle of the period devoted to obligatory noon-day prayers; 3 = the last part of this; 3.30 = the beginning, 4.30—5 = the middle, and 5.30 = the last part of the time of afternoon prayers; 6 = sunset; 7.30 = evening, especially referring to the time of commencement of the evening prayer; then come midnight and the last third of night, 3 a. m. = the single crowing of the cock, 4—4.30 = the continuous crowing of the cocks, nearly 5 = the streaks of dawn [5]. For the Malays of the Peninsula the following list is given: — just before dawn = before the flies are astir; after sunrise = the heat begins; about 8 a. m. = when the dew dries up; about 9 = when the sun is half-way above. Then follow: — when the plough rests; noon

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[1] Man, pp. 336 ff. [2] Nieuwenhuis I, 317. [3] Maass, pp. 511 ff. [4] Crawfurd, I, 287. [5] Snouck Hurgronje, I, 199 ff.

= just noon, right in the middle, when the shadows are round; afternoon = when the day turns back; about 1.30 p. m. = after (Friday) prayer; about 3 = when the buffaloes go to water; about 10 = when the children have gone to sleep [1].

The natives of the Solomon Islands have a rich terminology. In Buin the following degrees of brightness in the daylight are distinguished: — 4 a. m., 'it gradually begins to get light'; 5, 'the brightness is coming on'; 6, 'the sun shews himself'; 7, 'it is getting sun', 'the sun is there'; 10, 'the sun is over the side-rafters of the roof' (i. e. not yet quite overhead); 12 noon, 'the sun has come overhead'; 2 p. m., 'with westerly inclination', 'turning'; 3.30, 'it has come to the tying of the knot' (on the Gazelle Peninsula they say of this time 'the sun has sat down to glow'); 5, 'darkness is drawing near'; 6, 'it has begun to get dark'; 7, 'it has grown dark' [2]. Moreover there are words and expressions which mean 'middle of the heavens', 'the sun is over the ridge', 'the sun stands below 70° from the horizon', 'the sun is on the entrance-beam' [3]. A feature of special note here is that the houses (which must all be built facing the same direction) and their parts serve as aids in indicating time. The inhabitants of New Britain (Bismarck Archipelago) divided up the day according to the position of the sun, and had words for sunrise, noon, afternoon, the time of the declining sun, nearly sunset, sunset, and presumably some others [4].

The Polynesians mingle the time-indications based on the position of the sun with others which are derived from the life of men and nature. We are told that the Hawaiian day was divided into three general parts, 1, breaking the shadows, 2, the plain, full day, 3, the decline of the day. But this must be completed by what follows:— The lapse of night, however, was noted by five stations: 1, about sunset; 2, between sunset and midnight; 3, midnight; 4, between midnight and sunrise; 5, sunrise [5]. A native Hawaiian writes: — "When the stars fade away and disappear, it is *ao*, daylight; when the sun rises, day has come, *la;* when the sun becomes warm, morning is past; when the sun is directly overhead it is *awahea*, noon;

[1] Snouck Hurgronje, I, 200 n. 2; translator's note. [2] Thurnwald, p. 334. [3] *Ibid.*, p. 346. [4] Brown, p. 332. [5] Fornander, I, 121.

when the sun inclines to the west in the afternoon, the expression is *wa ani ka la.* After that come evening, *ahi-ahi* (*ahi,* fire), and then sunset, *napoo ka la,* and then comes *po,* the night, and the stars shine out". Other expressions are translated: — 'there comes a glimmer of colour on the mountains', 'the curtains of night are parted', 'the mountains light up', 'day breaks', 'the east blooms with yellow', 'it is broad daylight' [1].

These are, poetically regarded, very fine examples of the rich terminology for the time of transition between night and day. In Tahiti the day has six divisions which are fairly accurately determined by the height of the sun. Names are given for midnight, midnight to daybreak, daybreak, sunrise, the time when the sun begins to be hot, when it reaches the meridian, evening before sunset, the time after sunset [2]. The names for the times of day among the Society Islanders were particularly well developed. For the day there were two expressions according to its extension either from morning to evening twilight or from the rising to the setting of the sun. No division into regular periods was known, nor any means of establishing these; nevertheless the islanders distinguished a varying number of points of time, according to recurring physical changes, at unequal distances from each other. Thus: — the time of cock-crow, the first breaking of clouds, twilight, the stirring of the flies, the time at which a man's face can be recognised, daylight, the dipping forward of the sun's edge, sunrise, the sun above the horizon, the rays broadening over the land, the rays falling on the crown of the head, the same a little oblique, the shadow as long as the object, the same longer than the man, the sun near the horizon, sunset, the time at which the houses are lit up, twilight, night, midnight [3]. For the Marquesas are given: — daybreak, twilight, dawn, ('the day or the red sky, the fleeing night'), broad day — bright day from full morning to about ten o'clock—, noon ('belly of the

[1] Malo, pp. 33 ff. [2] Forster, pp. 441 ff. [3] Wegener, pp. 146 ff.; Ellis, *Pol. Res.*[3], I, 89. The former quotes the latter from the first edition, but Ellis l. c. leaves out the translation of the concrete terms for the times later than noon, and fills up the period from 7 a. m. to 6 p. m. with modern terms, e. g. 'about 7', '8 a. m.' etc.

sun'), afternoon ('back part of the sun'), evening ('fire-fire', the same expression as in Hawaii, i. e. the time to light the fires on the mountains or the kitchen fire for supper) [1]. The Samoans divided the day into first dawn, dawn, cock-crowing, day-break, the time when the bird *iao* was heard (*i* = call, *ao* = day-break), morning, the time to feed the tame pigeons (about 9 a. m.), the sun upright (= noon), half-way down (about 3 p. m.), sunset. After that the night was divided into: — the crying of the cricket (about 20 minutes after sunset), fire-lighting (about half-an hour later), the extinguishing of the lights (about 9 p. m.), midnight, and *tulna o pa ma ao*, 'the standing together of night and day' [2].

Indications of this nature are convenient only in countries in which the sun is neither too often nor too long hidden by clouds. When the sun is hidden the inhabitants have to manage as best they can. A very interesting statement in this connection is made by a Swahili native. In rainy days his tribe observed the crowing of the cock. At the first cock-crow they knew that it was 5 or 6 a. m.; when the cock failed to crow all sense of a division of time was lost to them [3].

The phenomena of Nature afford little basis for the naming of the times of day, since there is hardly one of them which recurs regularly every day at a definite time, with the exception of cock-crow, which is in great favour as an indication of the time before sunrise. Other exceptional cases are such names as that mentioned for the Society Islands, 'the stirring of the flies'; one given for the Mahakam Kayan of Borneo, *tiling* (a cricket which is only to be heard at sunset) *duan* (to sing) [4]; a couple of expressions of the Wadschagga, 'the cry of the partridge' in the evening, 'the turning of the smoke down the mountain' [5]; and one of the Nandi, 'the elephants have gone to water' [6]. But a people which devotes itself to cattle-rearing or to agriculture may borrow from its regular daily occupations expressions for the times of day. Thus the Mahakam Kayan, besides the above-mentioned name

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[1] Mathias G., pp. 210 ff. [2] Brown, p. 348. [3] Velten, p. 333. [4] Nieuwenhuis, I, 318. [5] Gutmann, p. 241. [6] Hollis, *Nandi*, p. 96.

for late afternoon and the term for noon (*beluwa ḍow*, 'half-day'), have an expression for about 4 p. m. — *ḍow uli*, i. e. 'the time of the home-coming from work in the fields'. The Javanese are strongly influenced by civilisation and have, especially for astrological purposes, a fully developed chronological system; not seldom, however, the times of day are given in relation to the rural labour. So they say 'when the buffalo is sent to the pastures', 'when the buffalo is brought back from the pastures' or 'is housed' etc.; but for the time of the occurrence of any event the position of the sun is usually indicated [1]. The Achenese and the Malays of Sumatra have an expression exactly corresponding to the Greek *βουλυτός* [2]. The Wadschagga have expressions for the position of the sun, but also others [3], among which may be mentioned 'the first going of the oxen to the pastures in the morning'. This kind of terminology seems to have been developed into a system among the Banyankole, a cattle-raising tribe of the Uganda Protectorate. The day is divided up in the following way: — 6 a. m., milking-time; 9 a. m., *katamyabosi*, not translated; 12 noon, rest for the cattle; 1 p. m., the time to draw water; 2 p. m., the time for the cattle to drink; 3 p. m., the cattle leave the watering-place to graze; 4 p. m., the sun shews signs of setting; 5 p. m., the cattle return home; 6 p. m., the cattle enter the kraal; 7 p. m., milking-time [4]. This terminology is of especial interest since it remains in various Indo-European languages as a relic of antiquity, and affords a hitherto little observed piece of evidence for the life of antiquity which agrees well with others. Compare Sanskrit *sagavás*, the time when the cows are herded together; *βουλυτός*, the time when the oxen were unyoked in the Homeric phrase *ἦμος δ'ἠέλιος μετενίσσετο βουλυτόνδε* [5]; and Irish *im-buarach*, morning, 'at the yoking of the oxen'. With rest or meal-times are associated Old High German *untorn*, 'noon', the time of the mid-day rest, Sanskrit *abhipitvam*, 'evening', and Lithuanian *piẽtus*, 'noon', which goes back to Sanskrit *pitus*, 'meal-time' [6].

[1] Crawfurd, I, 287. [2] Cp. above, p. 27. [3] Above, pp. 24, 30. [4] Roscoe, *Bantu*, p. 140. [5] 'As the sun turned over to the unyoking of the oxen'. [6] Feist, p. 262.

Time-indications of various kinds are, as we have seen, used alongside of one another; when they are fully employed a very highly organised terminology for the times of day may be arrived at. The names for the times of day among the Nandi seem almost artificial: — 2 a. m., the elephants have gone to the waters; 3, the waters roar; 4, the land (sky) has become light; 5, the houses are opened; 5.30, the oxen have gone to the grazing-ground; 6, the sheep have been unfastened; 6.30, the sun has grown; 7, it has become warm; 7.30, the goats have gone to the grazing-ground; 9, the goats have returned from the grazing-ground; 9.30, the goats sleep in the kraal; 10, the goats have arisen, the oxen have returned; 10.30, the oxen sleep; 11, untie the cattle, i. e. let the calves get their food, the goats feed; 11.30, the oxen have arisen; 12 noon, the sun has stood upright, the goats sleep in the wood; 12.30, the goats have drunk water; 1 p. m., the sun turns, i. e. goes towards the west, the cattle have drunk water; 1.30, the drones hum; 2, the sun continues to go towards the west, the oxen feed; 3, the goats have been collected; 4, the oxen drink water for the second time, the goats have returned; 4.30, the goats sleep; 5, the eleusine grain has been cleaned for us, take the goats home, shut up the calves; 5.30, the goats have entered the kraal; 6, the sun is finished, the cattle have returned; 6.15, milk (sc. the cows); 6.45, neither man nor tree is recognisable, cattle-fold doors have been closed; 7, the heavens are fastened; 8, the porridge is finished; 9, those who have drunk milk are asleep; 10, the houses have been closed; 11, those who sleep early wake up; 12, the middle of the night [1].

As a last example I give the most detailed list of all, from the neighbourhood of Antananarivo, the capital of Madagascar. The times given are naturally to be taken on the average. 12 midnight, centre of night or halving of night; 2 a. m., frog-croaking; 3, cock-crowing; 4, morning also night; 5, crow-croaking; 5.15, bright horizon, glimmer of day, reddish east; 5.30, the colours of cattle can be seen, dusk, diligent

[1] Hollis, *Nandi*, pp. 96 ff.

people awake, early morning; 6, sunrise, day-break, broad daylight; 6.15, dew falls, the cattle go out; 6.30, the leaves are dry (i. e. the dew disappears); 6.45, the hoar-frost disappears, the day chills the mouth (this applies only to the two or three winter months); 8, advance of the day; 9, (the sun is) over (at a right angle with) the purlin; 12 noon, over the ridge of the roof. — In the forenoon the position of the sun nearly square with the eastern purlin of the roof marked about 9 o'clock; and as noon approached, its vertical position about the ridge-pole, or at least its reaching the meridian, clearly indicated 12 o'clock. In regard to the terms for the afternoon we must bear in mind that the houses in former times were always built with their length running north and south and with the single door and window facing the west; the sunlight coming in after midday at the open door by its gradual progress along the floor gave a fairly accurate measure of time. The house therefore served, as among the Dyaks, as a kind of sun-dial. — 12.30 p. m., day taking hold of the threshold; 1, peeping in of the day (into the room), day less one step; 1.30—2, slipping of the day, decline of the day, afternoon; 2, (the sun) at the rice-pounding place (i. e. the sunbeam falls on the rice mortar), at the house-post (there were in the house three posts supporting the ridge: in the southern one there were notches, *jinja andry,* from which the advance of the sunlight and of the day was observed); 3, at the place of tying the calf (as the rays reached the one of the posts to which the calf was tied at night); 4, at the sheep- or poultry-pen; 4.30, the cow newly calved comes home; 5, the sun touching (i. e. when the declining sunshine reached the eastern wall of the house); 5.30, the cattle come home; 5.45 sunset flush; 6, sunset (lit. 'sun dead'); 6.15, the fowls come in; 6.30, dusk, twilight; 6.45, the edge of the rice-cooking pan is obscure; 7, people begin to cook rice; 8, people eat rice; 8.30, finished eating; 9, people go to sleep; 9.30, everyone in bed; 10 gun-fire; 12, midnight [1].

Finally I collect the Homeric expressions for the parts

[1] Sibree, pp. 69 ff.

of the day. They are far from being so elaborately organised as the examples quoted above, and many are incidental periphrases; the terminology is still at its beginnings. Its character is quite primitive also in the juxtaposition of terms of different kinds. The day is divided into the familiar three parts. 'It will be a dawn, or an afternoon, or a noon when I am to be killed', says Achilles [1]. The meaning of *ἠώς*, 'dawn', is also extended so that the word can denote forenoon or at least morning. Cp. the following phrases: — 'I slept the whole night and to the dawn and to the noon', [2] 'as long as it was dawn and the holy day increased' [3]; of this the phrase already quoted, 'as the sun turned over to the unyoking of the oxen', is the counterpart. In this sense appears also the derivative *ἠοίη*. When Menelaus wishes to surprise the Old Man of the Sea he goes to the seashore 'as the dawn appeared' [4]: the Old Man is said to come 'as the sun ascends the middle of the heavens' [5]. Thus 'we waited the whole dawn' until 'the Old Man came up from the sea at noon' [6]. The afternoon, in which the suitors amuse themselves with dance and song, is also called eventide [7]; when evening, *ἕσπερος*, comes, they go home to sleep [8]. Besides these larger divisions smaller ones were also indicated, e. g. the morning twilight, 'when it was not yet dawn but still the twilight of the ending night' [9]. Before dawn there appears the morning star, *ἑωσφόρος*' Il. XXIII, 226, Od. XIII, 93. *ἠώς*, 'dawn' in the proper sense of the word, is often used as a time-indication, sometimes in the well-known periphrastic expressions of Il. XI, 1, XIX, 1, Od. V, 1. XXIII, 347, XXII, 197, sometimes alone, e. g. 'at dawn', 'at the appearance of dawn' [10]. Sunrise is always indicated by verbal and often periphrastic expressions, simply by *ἀνιέναι*, 'rise' [11], further 'the sun, leaving the fair sea, rose into the all-brazen heaven to shine for the

[1] *ἔσσεται ἢ ἠὼς ἢ δείλη ἢ μέσον ἦμαρ* — Il. XXI, 111. [2] *εὗδον παννύχιος καὶ ἐπ' ἠῶ καὶ μέσον ἦμαρ* — Od. VII, 288. [3] *ὄφρα μὲν ἠὼς ἦν καὶ ἀέξετο ἱερὸν ἦμαρ* — Od. IX, 56. [4] *ἦμος . . . . φάνη . . . . Ἠὼς* — Od. IV, 431. [5] *ἦμος δ' ἠέλιος μέσον οὐρανὸν ἀμφιβεβήκῃ* — Od. IV, 400. [6] *πᾶσαν δ' ἠοίην μένομεν . . . . ἔνδιος δ' ὁ γέρων ἠλθ' ἐξ ἁλός* — Od. IV., 447—50. [7] *δείελον ἦμαρ* — Od. XVII, 606. [8] Od. I, 422. [9] *ἦμος δ' οὔτ' ἄρ πω ἠὼς ἔτι δ' ἀμφιλύκη νύξ* — Il. VII, 433. [10] *ἅμ' ἠοῖ* — Il. VII, 331, Od. XVI, 2; *ἅμα δ' ἠοῖ φαινομένῃφιν* — Il. XI, 685; Od. IV, 407. [11] Il. VIII, 538; Od. I, 24.

immortal ones' etc. [1], and 'neither as he ascends to the starry heaven nor as he again turns back to the earth from the heavens' [2], similarly Od. XII, 380 ff., Il. XI, 735 'as long as the shining sun rose above the earth' [3], and Il. VII, 421 ff. 'the sun thereafter once more struck the fields, ascending in the heavens from the deep and soft-flowing ocean' [4]. The expression can therefore also include the time immediately following after sunrise, but is not applied to the whole period of the sun's ascension, i. e. the forenoon. The culmination of the sun is mentioned in Od. IV, 400 (cp. above) and in Il. VIII, 68. The decline of the day is thus described, 'the day was for the greater part gone' [5]; for the sinking of the sun see Od. XI, 18, XII, 381 (cp. above), and the already quoted expression 'the sun turned over to the unyoking of the oxen'. Sunset (Il. XVII, 454, XVIII, 241, Od. II, 388) is described by the common word *δύνειν*, 'set', or by 'goes under the earth' [6], or 'the bright light of the sun sank down in the ocean, drawing after himself the dark night' [7]. The evening star has the same name as evening, *ἕσπερος* [8]. The Homeric Greeks therefore do not seem to have observed the position of the sun in any but the most general fashion. We may add certain indications taken from the business of daily life. The word *βουλυτός* (cp. above p. 31) appears in the twice-recurring verse 'as the sun turned over to the unyoking of the oxen' [9]. It is not the sun but the ploughman that unyokes the oxen: the word has therefore become established as a chronological *terminus technicus* which is significant on account of its antiquity. About the expression *ἐν νυκτὸς ἀμολγῷ* there has been much dispute. It occurs: — Il. XI, 173 and XV, 324, where lions surprise a herd, XXII, 28, in the simile of the morning rising of Sirius, 317, of the shining forth of the evening

[1] *ἠέλιος δ' ἀνόρουσε λιπὼν περικαλλέα λίμνην οὐρανὸν εἰς πολύχαλκον, ἵν' ἀθανάτοισι φαείνοι* — Od. III, 1 f. [2] *οὔθ' ὁπότ' ἂν στείχῃσι πρὸς οὐρανὸν ἀστεροέντα, οὔθ' ὅτ' ἂν ἄψ ἐπὶ γαῖαν ἀπ' οὐρανόθεν προτράπηται* — Od. XI, 17. [3] *εὖτε γὰρ ἠέλιος φαέθων ὑπερέσχεθε γαίης* — Il. XI, 735. [4] *ἠέλιος μὲν ἔπειτα νέον προσέβαλλεν ἀρούρας, ἐξ ἀκαλαρρείταο βαθυρρόου Ὠκεανοῖο οὐρανὸν εἰς ἀνιών* — Il VII, 421 ff. [5] *μέμβλωκε μάλιστα ἦμαρ* — Od. XVII, 190. [6] *εἰσ' ὑπὸ γαῖαν* — Od. X, 191. [7] *ἐν δ' ἔπεσ' Ὠκεανῷ λαμπρὸν φάος ἠελίοιο ἕλκον νύκτα μέλαιναν* — Il. VIII, 485. [8] Od. XXII, 318. [9] *ἦμος δ' ἠέλιος μετενίσσετο βουλυτόνδε* — Il. XVI, 779; Od. IX, 58.

star, Od. IV, 841 'so clear appeared the dream to her' [1]: it is a well-known fact that we dream for the most part shortly before waking. The sense 'beginning or end of night' is therefore fully confirmed. As for the etymology I do not hesitate to pronounce in favour of that lying nearest to hand, viz. *ἀμέλγειν*, 'to milk', and therefore 'milking-time'. Compare the terms of the Banyankole for early morning at 6 o'clock and evening at 7 — 'milking-time' — and those of the Nandi: 6 p. m. 'the sun is over, the cattle have come back'; 6.15, 'milk' (sc. the cows). That only these two expressions have settled into *termini technici* admits of a not unimportant conclusion in regard to antiquity. The meal-hour as an indication of time occurs Il. XI, 86, 'when a wood-cutter prepares his meal after having fatigued his arms by felling large trees' [2], and Od. XII, 439, 'when a man rises from the market-place to go home to the meal after having judged many quarrels' [3], — in the latter instance in connexion with the market. This time-indication was destined to have a great future as the social life of the Greeks developed. Phrases such as the following are of common occurrence: — 'when the market-place is full' [4], 'before the market-place has filled itself' [5], 'the breaking up of the assembly of the market-place', [6] etc. The night was divided into the familiar three parts (although the expression *μέση νύξ*, 'middle of the night', first occurs in the smaller Iliad) and was judged according to the position of the stars: — 'Let us go, for the night draws close to an end and the dawn is near. The stars are far gone. The greater part of night is gone, the two parts, only the third part remains' [7]; 'when it was the third part of the night and the stars had passed' [8]. The morning star serves

[1] *ὣς οἱ ἐναργὲς ὄνειρον ἐπέσσυτο νυκτὸς ἀμολγῷ* — Od. IV, 841. [2] *ἦμος δὲ δρυτόμος ἀνὴρ ὠπλίσσατο δεῖπνον ..... ἐπεί τ' ἐκορέσσατο χεῖρας τάμνων δένδρεα μακρά* — Il. XI, 86. [3] *ἦμος δ' ἐπὶ δόρπον ἀνὴρ ἀγορῆθεν ἀνέστη κρίνων νείκεα πολλά* — Od. XII, 439. [4] *ἀγορῆς πληθυούσης* — Herod. IV, 181; even in a Delphian sacred decree, *Syll. inscr. graec.*[3] 257; *περὶ ἀγορὰν πλήθουσαν* — Xen., *Anab.* II 1, 7; *ἀγωρῆς πληθώρη* — Herod. II, 173. [5] *πρὶν ἀγορὰν πεπληθέναι* — Pherekr., *Autom.* 9. [6] *ἀγορῆς διάλυσις* — Herod. III, 104. [7] *ἀλλ' ἴομεν· μάλα γὰρ νὺξ ἄνεται, ἐγγύθι δ' ἠώς. ἄστρα δὲ δὴ προβεβήκε, παροίχωκεν δὲ πλέων νὺξ τῶν δύο μοιράων, τριτάτη δ' ἔτι μοῖρα λέλειπται* — Il. X, 251. [8] *ἦμος δὲ τρίχα νυκτὸς ἔην, μέτα δ' ἄστρα βεβήκει* — Od. XII, 312, and XIV, 483.

as a time-indicator at the nocturnal home-coming of Odysseus [1].

The Latin expressions I merely copy from Censorinus, Ch. 24, and insert in brackets the additions made by Macrob., *Sat.* I, 3, 16 ff. *Tempus quod huic* — i. e. *nox media — proximum est vocatur de media nocte (media noctis inclinatio), sequitur gallicinium, cum galli canere incipiunt, deinde conticinium, cum conticuerunt; tunc ante lucem, et sic diluculum, cum sole nondum orto iam lucet. secundum diluculum vocatur mane cum lux videtur sole orto, post hoc ad meridiem, tunc meridies, quod est medii diei nomen, inde de meridie (inde — i. e. a meridie — tempus occiduum), hinc suprema . . . . . post supremam sequitur vespera ante ortum scilicet* — this must be before the appearance of the star — *eius stellae, quam Plautus vesperuginem . . . . appellat.* There are also *ortus* and *occasus solis*, *crepusculum*. This terminology is poor and applies almost exclusively to the daylight. In ancient Rome the edifices of the Forum are said to have served as sun-dials. A servant of the consul proclaimed noon "when the sun peeped between the Rostra and the Graecostasis; when the sun sank from the Maenian column to the prison he proclaimed evening, but only on clear days" [2]. With the advance of civilisation the Greek terms for the twelve hours of the day, each of which varied in length according to the time of the year, became customary, a fact which is connected with the spread of sun- and water-clocks [3]. Hence arises in the Middle Ages the terminology derived from the daily mass (*hora canonica*) [4]. In daily life there was often a recurrence to primitive methods. I borrow a few examples of a quite primitive character from the early medieval tract *Peregrinatio Aetheriae*: — 'the hour when people can recognise each other' [5],

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[1] Od. XIII, 93. [2] *cum a curia inter rostra et graecostasin prospexisset solem; a columna Maenia ad carcerem inclinato sidere supremam pronuntiavit, sed hoc serenis tantum diebus* — Pliny, *Nat. Hist.*, VII, 214. [3] G. Bilfinger, *Stundenangaben, Zeitmesser. Hora sexta* is, for example, 6 o'clock, not the sixth hour. It seems to me as though *hora* refers to the hour-line. [4] Bilfinger, *Stundenang.*, p. 131; Ginzel, III, 89. [5] *ea hora qua incipit homo hominem posse cognoscere*, XXV, 6.

'when the crow of cocks begins' [1], 'from the first cock-crow' [2], etc., but also *hora tertia, quinta, sexta* (noon).

An obviously isolated method is the determination of the times of day from the daily twice-recurring ebb and flow of the tides; the method is also very unsuitable, since the period of a complete tide is 12 hours 25 minutes, so that the two periods together exceed the day by nearly an hour. In fact the Eskimos of Greenland are the only people who reckon by the tides. They divide up the day according to ebb and flow, although they must always reckon differently on account of the variations of the moon [3]. Dalsager [4] also points this out and remarks that their reckoning cannot last for two consecutive days, so that they have to make a fresh division every day. The rudiments of this method are however seen among some of the tribes of Polynesia. Immediately after the above-quoted divisions of the day among the Society Islanders are mentioned "the longer periods before noon and midnight during which the sea rises, and the others following these, in which it falls" [5], and "night or, the light quite gone, when the sea begins to flow towards the land, about 11 at night" [6]. The Hawaiians called the rising of the tide by such names as the rising, big, full, and surrounding sea; when the water neither rose nor fell it was called the standing sea; the ebbing sea they spoke of as the parted, retiring, and defeated sea [7].

The night is the time of complete darkness and rest, and therefore the frequently mentioned expression, 'sleeping-time', corresponds to night. Seldom is the whole time during which the sun remains below the horizon to be understood by it. On the Society Islands there were two expressions for day according to its extension from morning to evening twilight or from sunrise to sunset [8]. The Hawaiian judge, Fornander, follows this mode of speech when he distinguishes five periods of night, (1) about sunset, (2) between sunset and midnight, (3) midnight, (4) between midnight and sunrise, and (5) sunrise [9]. For the times between sunset and night-fall and between night

[1] *cum aperit esse pullorum cantus,* XXXVI, 1. [2] *de pullo primo,* XXXV, 1. [3] Crantz, I, 294. [4] p. 55. [5] Wegener, p. 147. [6] Ellis, *Pol. Res.*[3], I, 89. [7] Malo, p. 49. [8] Wegener, p. 146; cp. above, p. 29. [9] Fornander, I, 121.

and sunrise there is a rich terminology which has already been illustrated. During the night itself time-indications are for obvious reasons scanty. Often the only point distinguished is midnight, e. g. by the Kiowa [1], the Masai [2], the Shilluk [3]; 'the silence of the land' among the Babwende [4], 'the back of night' among the Hottentots [5], 'the time of sleep' among the Hawaiians [6]. Hence arises of itself a threefold division in which the periods of night before and after midnight are distinguished, as e. g. by the Hawaiians [7]. The usual method is to start from the day, i. e. the limit of the day, and then to proceed on both sides in the direction of midnight, as in the late evening of the Hottentots, which extends till long after sunset [8], and the 'not yet early' and the *tara* (beginning at dusk and extending till the time of rest) among the Masai [9], etc. The Tahitians are credited with six divisions of the day and as many of the night, this more accurate division of night being of course determined by the stars [10]; the only expressions reported however are those for midnight and the time from midnight to daybreak [11]. On the Marquesas Islands the first night-watch was 'the hour of ghosts'; the advanced night was termed 'black night', and midnight 'great sleep'; the last watch of night was 'the coming of day' [12]. The Wadschagga have three night watches: — the awakening in the evening, that in the middle (midnight), and that in the morning twilight [13]. The Javanese have night, midnight, and waning of night [14]. Where the cock is kept, its crow serves as a sign that the night is drawing to an end, as for instance among the Swahili [15], and in the Dutch Indies [16]; the Yoruba distinguish other cock-crowings, such as 'the cock opening the way', i. e. the first cock-crowing, 'the time of the cock-crowing immediately before sunset' [17]. Quite exceptional however is the device ascribed to the inhabitants of the New Hebrides. In order to denote the hours of the

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[1] Mooney, *Rep.*, p. 365. [2] Merker, p. 153. [3] Westermann, p. 105. [4] Hammar, p. 156. [5] Schulze, p. 373. [6] Malo, p. 33. [7] Cp. above, p. 28. [8] Schulze, p. 373. [9] Merker, p. 153. [10] See below, p. 40. [11] Forster, p. 441. [12] Mathias G., p. 210. [13] Gutmann, p. 241. [14] Crawfurd, p. 271. [15] Velten, p. 333. [16] Wilken, p. 200. [17] Ellis, *Yoruba*, p. 150.

night they make a gesture in the direction of the spot where the sun would be at the corresponding hour of day [1].

There is only one means of accurately indicating the times of night, and that is by the observation of the stars. Many peoples judge from the position of the morning-star the time that has yet to elapse before sunrise: but this cannot always be done, and in any case the method is only of use in the early morning. But the fixed stars are always there. The difficulty however arises that every day the stars gain about four minutes on the sun; the stars must therefore be accurately known, and the observer must either be acquainted with their positions at definite times of the year or else be constantly choosing a new star as his chronometer. Not many peoples have got so far as that. Although the science of astronomy was very well developed among the Polynesians, we are told of the Tahitians that to distinguish the hours of night by means of the stars was a science with which very few of them were acquainted [2]. On the Society Islands the advance of night was determined from the stars [3]; and so in Hawaii, with as great accuracy as the hours of the day from the sun [4]. "When the Milky Way passes the meridian and inclines to the west, people (in Hawaii) say 'the fish has turned'" [5]. Among the Indians of South America the knowledge of the stars is very wide-spread. E. Nordenskjöld, who visited the border districts where Brazil, Bolivia, and the Argentine meet, says repeatedly that the stellar heavens are the Indian's clock and compass. When sitting in their huts they can, without looking out, indicate the positions of the more important constellations in the sky. If one is out with an Indian at night he will point to Orion or some other constellation and shew how far it will have moved on before the end of the journey is reached [6]. The Eskimos of Greenland, when it is dark, indicate the time from *nelarsik* (Vega) [7]; or from the Pleiades [8]. Among them the observation of the stars is uncommonly well developed. The Lapps, who have to tend

[1] Oliveau, p. 343. [2] Forster, p. 441. [3] Wegener, p. 148. [4] Dibble, p. 107. [5] Malo, p. 33. [6] Nordenskjöld, *Indianlif*, p. 273. [7] Holm, *10*, 142, or *39*, 85 and 106. [8] Egede, p. 131.

their reindeer during the long winter nights, determine the course of time by certain stars. *Sarvon* is the largest star in the heavens: when in winter it stands in the middle of the sky it marks midnight; it is called the night-clock of the Lapps. The Great Dog, the Old Man, and the Old Woman are three stars that pursue *sarva*. They rise when the people go to sleep, and set a little before daybreak. They ascend the heavens obliquely in front of *sarva,* in the morning they dip downwards. Another authority states that *sarva* is the Great Bear; the first couple of stars in it are the Old Man and the Old Woman, the second the Dog and the Elk. The reindeer herdsman decides from it how far night is advanced, and when he may expect to be relieved. *Lovosj* or *suttjenes* is the name given to the Pleiades. The constellation indicates midnight, when the weather is good. A fable tells how this constellation saved a servant who had been driven out by his master into the great cold of a winter night. The young men wish the maidens to tend the reindeer by night and say: — "Go and kiss the *suttjenes* young men", but the maidens answer: — "Go yourselves and kiss the *suttjenes* maidens" [1]. Of the old Icelanders Kålund writes: — "At night the moon and certain stars, especially the Pleiades, afford them the same aid" (i. e. as the signs of day) [2]. The Homeric Greeks — at least in a general fashion — also judged of the advance of night by the position of the stars [3]. This more accurate method is therefore peculiar to a few primitive peoples specially gifted in astronomy.

From the investigation of the modes of naming and reckoning the day and its parts it follows for primitive time-reckoning in general that the time-indications refer to concrete phenomena, and therefore either they indicate a point of time or, if they are related to periods, these periods are of different and fluctuating length. They are accordingly of no use in calculating, they cannot simply be added together even when a number of such periods together make up the period of a complete day, i. e. they are fundamentally discontinuous. When several days are to be counted the *pars pro toto* method is used:

[1] Drake, pp. 277 ff. [2] Paul, III, 447; cp. above, p. 21. [3] See above, p. 36.

instead of the whole day a part is counted. Within the day two phenomena chiefly recur with such unfailing constancy as to be of use in counting: they are the daily reviving sun and the night or sleeping-time. The word for sun is often the same as that for day. Within the day fall a number of occupations which chiefly turn the attention to its length and varying phenomena, and this is the case also with the sun itself, for the varying position of the sun in the heavens affords the most usual mode of indicating the time of day. For the counting a point of time is best suited, or, which comes to the same thing, a unit without subdivisions, a blank period. This is the reason why the counting by 'sleeps' or nights predominates. On the same grounds the quite isolated *pars pro toto* counting of the days from the dawns in Homer may be explained. To indicate the duration of time primitive peoples make use of other means, derived from their daily business, which have nothing to do with time-reckoning; in Madagascar 'rice-cooking' often means half an hour, 'the frying of a locust' a moment [1]. The Cross River natives say: — 'The man died in less than the time in which maize is not yet completely roasted', i. e. less than about 15 minutes; 'the time in which one can cook a handful of vegetables', i. e. an hour [2]. The Malays, the Javanese, and the Achenese use the following expressions for a period of time: — a blink of the eyes (literally), the time required for chewing a quid of *sirih* (about 5 minutes), the time required for cooking a *kay* of rice (about half an hour), for cooking a *gantang* of rice (about an hour and a half), half a day, a 'sun-dark', i. e. a complete day and night [3]. The natives of New Britain (Bismarck Archipelago) measure the time between sunset and the moon-rise by the smouldering of a torch or the time occupied in cooking yams, taro, or wild taro. Short divisions of time were also expressed by comparative terms, e. g. the throwing of a stick for a short distance, 'a woman's crossing', or the distance a woman would paddle [4]. Very often duration of time is indicated by reference to the time needed to traverse a well-known piece of road

[1] Sibree, pp. 69 ff. [2] Mansfeld, p. 244. [3] Snouck Hurgronje, I, 201. [4] Brown, p. 332.

between two places. Examples are superfluous. But all these indications of periods of time are found among more developed peoples: the primitive peoples pay little or no attention to them.

Both in the case of the day and in that of the other time-units this clinging to a natural basis long proved a hindrance to a rational system of time-reckoning, which could only be achieved by breaking away from natural phenomena. For there are no fixed natural limits of day, but if morning and evening, or still more clearly sunrise and sunset, are chosen as the limits, these must change every day and the days will vary in length. Here the midnight period proved of assistance, since it facilitated the establishing of a fixed point of divergence. This was done in Rome, and the practice had its root in daily life, where in order to indicate the time of occurrence of events which took place in the night-time the calculation was pushed forwards on both sides towards midnight, until this became the limit of divergence. It is however an artificial epoch that must be found by calculation [1].

In the second place the hour of antiquity is a twelfth part of the whole time of daylight, and this duodecimal division was also transferred to the night, which had commonly been divided into four watches according to the practice borrowed from military life. This hour therefore varied in length according to the time of the year. The inconvenience of a varying division of this nature must have made itself felt in daily life, although in the south it was not so insupportable as it must have been in the north. It rendered the construction of the clock difficult, and above all was impracticable for scientific astronomy. Hence alongside of it appeared even in antiquity the hour of constant length or the double hour, viz. a twelfth or a twenty-fourth part respectively of the complete day. The double hour, notwithstanding Bilfinger's assertion to the contrary, arose in Babylon (*kasbu*), and is connected with the duodecimal division of the zodiac [2]. This hour of constant length was not generally adopted until very late: the varying hour remained al-

[1] Cp. Bilfinger, *Der bürgerliche Tag*, pp. 198 ff., and my *Entstehung* p. 13.
[2] Bilfinger, *Doppelstunde;* for the other side see Boll, *Sphaera*, pp. 311 ff.

most up to the end of the Middle Ages. Our modern hour has only been in general use since about the 14th century, when it was first spread by the construction of the striking-clock [1]. Its convenience for the business of practical life and the construction of the clock together secured the victory of the hour as $^1/_{24}$th of the day, originally a numerical and astronomical division. A condition for its use was the fusion of day and night into one unit, since as long as these were kept separate the constant hour could not thrive. Both the complete day and its regular divisions however only won their way after a very long time, because men were unwilling to depart from the natural basis in time-reckoning. The substitution of the artificial for the natural time-reckoning has also, as far as the day is concerned, created a rational system of reckoning which has borrowed from the natural system only one feature, viz. the average length of the complete day.

[1] Ginzel, III, 93 ff.

CHAPTER II.

THE SEASONS.

The year is for us a numerical quantity of 365 or 366 days. But we speak of the year in two senses, first as the calendar year beginning on New Year's Day, and secondly as the current year, a period of the same number of days beginning at one chosen day, as for instance in giving a person's age. The word 'year' may however also represent the highest chronological unit even independently of the seasons, as in the case of the Egyptian shifting year of exactly 365 days, and the Islamite lunar year of 354. These however are exceptional cases. At the basis lies the natural year conditioned by the course of the sun and by the natural phases dependent thereon, which penetrate closely into the life of man. This connexion has necessitated the agreement of the numerical year with the sun, whence arises a situation very inconvenient for reckoning, namely that years of a varying number of days have to be accepted, since the natural year does not contain a whole number of days.

The year as a numerical quantity is only the tardily attained summit of development, and the connexion with the natural year has always been so strongly felt that, except in certain cases such as the Egyptian and Islamite years, the chronological year has had to adjust itself accordingly. Here also we see the point of departure, the natural phenomena which are in the end dependent upon the course of the sun, such as the variation between heat and cold, verdure and snow, rainy season and drought, the blooming and withering of vegetation, between the different trade-winds or monsoons, between abundance and scarcity of food. With these and similar con-

crete phenomena the time-reckoning is from its origin bound up, and is at first discontinuous, i. e. it fixes the attention solely on the phenomena in question, and not on the year as a whole. The fusion of the various seasons into the circle of the year is arrived at only by degrees: the year is at first counted by the *pars pro toto* method. The process is therefore similar to that already found in the discussion of the day.

It must be granted as a premise to our investigation that when we speak of 'seasons' not only the larger divisions of the year are to be understood by the word — those which alone of all the natural epochs of the year are current among us to-day — but also smaller divisions which might perhaps be called seasonal points; for instance the times of cherry-blossoming and hop-picking are also seasons. Such short — often very short — seasons are not distinguished in any important feature from the longer: the difference only arises from the longer or shorter duration of the phenomena in question. The Hidatsa Indians describe any period thus marked by a natural occurrence, be it long or short, the hot season or the season of strawberries, by the same word, *kadu,* 'season', 'time' (of the occurrence), and the longer seasons include shorter [1].

We begin with these shorter seasons since they are more foreign to us: to primitive man however they are of extreme importance, since in the absence of a regular calendar they afford the only means he knows of determining the shortest periods of the natural year, in so far as they are connected with this. A time-determination of this nature is important not so much for giving the date of any occurrence as for establishing beforehand the time of certain occupations, e. g. sowing or a festival.

The classical instance is afforded by the peasants' maxims of Hesiod. The cry of the migrating cranes shews the time of ploughing and sowing [2]. If one sows too late, the crop may still thrive if Zeus sends rain upon it on the third day after the cuckoo has called for the first time in the leaves of the oak

[1] Matthews, p. 4. [2] Hesiod, *Op.*, v. 448.

(486). Before the appearance of the swallow, the messenger of spring, the vines should be pruned (568). But when the snail climbs up the plants there should be no more digging in the vineyards (571). When the thistle blossoms and the shrill note of the cicada is to be heard, summer has come, the goats are at their fattest, and the wine is at its best (582). The sea can be navigated when the fig-tree shews at the end of its branches leaves which are as big as the foot-prints of the crow (679). Especially well-known and beloved as a sign that the hard winter was over was the swallow: evidence is afforded by the famous procession of the Rhodian swallow-youths [1], and by a vase-decoration clearly expressing the delight felt at the appearance of the herald of Spring [2]. The observation of the birds of passage was very useful for this kind of time-determination: Homer already knows it, 'when the cranes flee the winter', he says [3], so also Theognis: "I hear, son of Polypais, the voice of the shrill-crying crane, even her who to mortals comes as harbinger of the season for ploughing" [4]. Aristophanes makes his birds boast of it: —

"All lessons of primary daily concern
You have learnt from the Birds, and continue to learn.
Your best benefactors, and early instructors,
We give you the warning of seasons returning.
When the Cranes are arranged, and muster afloat
In the middle air, with a creaking note,
Steering away to the Libyan sands,
Then careful farmers sow their lands;
The crazy vessel is hauled ashore,
The sail, the ropes, the rudder, and oar
Are all unshipped, and housed in store.
The shepherd is warned, by the Kite reappearing,
To muster his flock, and be ready for shearing.

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[1] Athenaeus, VIII, p. 360 C; for modern swallow-processions and songs see Abbot, p. 18. [2] Baumeister, *Denkm. des klass. Alt.*, III, p. 1985, fig. 2128. [3] *αἵτ' (γέρανοι) ἐπεὶ οὖν χειμῶνα φύγον* — Il. III, 4. [4] *ὄρνιθος φωνήν, Πολυπαίδη, ὀξὺ βοώσης ἤκουσ', ἥτε βροτοῖς ἄγγελος ἦλθ' ἀρότου ὡραίου* — Theognis, vv. 1197 ff.

You quit your old cloak at the Swallow's behest,
In assurance of summer, and purchase a vest" [1].

Similar time-determinations from natural phenomena are still not entirely neglected by the modern peasant. In Bohuslän (W. Sweden) the sowing-time was at hand when the swallow had come, it was the right sowing-time when the juniper flowered. In northern Scania (S. Sweden) the barley was to be sown when the hawthorn was in bloom. Older people could not give their birthdays but only knew that they were born e. g. at the rye- or potato-harvest, when the cattle were first driven out to pasture (in the spring), etc. My father knew quite well that his birthday was the fifth of September, but when anyone asked him when he was born he would generally answer: 'When they pick hops'. The Eskimos said that such and such a person was born when eggs were collected or seals caught[2]. From modern Palestine a bond is quoted in which a sum of money was to be paid when next the *fakûs* (a kind of cucumber) was ripe [3].

We return to the primitive peoples and give first a few examples in which a natural phenomenon serves as the sign of the beginning of one of the longer divisions of the year or of some occupation, generally agriculture. Of the Bushmen we are told that they paid particular attention to the time at which the first thunder-storm broke. They hailed it with great joy since they counted it a sure sign that summer had commenced. In the midst of their excessive rejoicing they tore in pieces their garments of skins, threw them into the air, and danced for several nights in sucession. The Garieb Bushmen made great outcries accompanied with dancing and playing upon their drums [4]. The Banyankole of Uganda used the euphorbia trees to guide them as to the nearness of the rainy season: when these trees began to shoot out new growth they knew that the rains were near [5]. The Indians of the Orinoco took great pains to determine the approach of the

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[1] Aristoph., *The Birds*, translated by J. H. Frere, vv. 709 ff. [2] Cranz, I; 293. [3] Wilson, p. 297. [4] Stow, p. 112. [5] Roscoe, *Bantu*, p. 140.

rainy season, as Gilij relates in a chapter entitled: *De segni, che precedon l'inverno* [1]. The signs were: — The scream of the Araguato monkeys at midnight or at the approach of day; the sudden bursting into blossom of certain trees; the swelling of the brooks, which almost dry up in summer but swell a few days before the rainy season; the yams which in summer have lost their leaves suddenly grow green again when the rainy season is at hand; finally the heliacal setting of the Pleiades. The tribe of the Bigambul in S. E. Australia reckon the seasons from the blossoming of certain trees. *Yerra,* for example, is the name of a tree that blossoms in September: this time of the year is therefore called *yerrabinda.* The apple-tree blossoms at Christmas time, which is called *nigabinda.* The iron-bark tree blossoms about the end of January, and this time is called *wobinda.* The height of summer however is named by them 'the time when the ground burns the feet': at this time no trees blossom [2]. The natives of New Britain (Bismarck Archipelago) determine the planting-season from the buds of certain trees and from the position of certain stars [3]. In Alu (Solomon Islands) one division of the year is determined from the bloom on the almond, another from the Pleiades [4]. The time for the sun-dance of the Kiowa Indians is determined by the whitening of the down on the cotton-plant [5]. One of the annual festivals of the Society Islands is regulated by the blossoming of the reed [6].

Instances are numerous in which phenomena like those mentioned by Hesiod serve as signs for agricultural labour. The Indians of Pennsylvania say that when the leaf of the white oak, which comes out in spring, is as large as a mouse's ear it is time to plant maize: they note that the whippoorwill has come by then, and is constantly fluttering round them calling out his Indian name *wekolis* in order to remind them of planting-time, just as if he were saying *'hacki heck'*, 'go and plant maize' [7]. Among the Thonga the period in July when the warm weather begins is called *shimunu,* 'the little

[1] Gilij, II, 20 ff.; ch. VII. [2] Howitt, p. 432. [3] Brown, p. 332. [4] Thurnwald, p. 342. [5] Mooney, *Rep.*, p. 367. [6] Ellis, *Pol. Res.*[2], I, 352. [7] Heckewelder, p. 525.

heat': the mahogany and sala trees become covered with leaves, certain flowers blossom. Winter has passed away, soon the summer will come. When the Thonga woman notes these signs she picks up her hoe and sets off for the hills or the marshes to make the fields ready. In January comes *nwebo*, the time for the first ears of maize to ripen [1]. Among the Ba-Ronga January is *nuebo*, the time of the first ripe ears: great pains are taken to keep away the birds from the *sorgho* fields, and therefore one period is known as 'the time when the birds are driven away' [2]. When a certain mushroom named *kulat bantilong* appears in large quantities the Dyaks of S. E. Borneo regard it as a sign that the time for rice-planting has come [3]; among the Malgassi the blossoming of the shrub *Vernonia appendiculata* in November is regarded in the same way [4]. In New Zealand plants and birds which appear at regular seasons give signs of the approach of the time to begin agricultural labours. Two kinds of migratory cuckoo, *Cuculus piperatus* and *nitens*, which appear at Christmas-time on the coasts, mark the period of the first potato-harvest. The flowering of the beautiful *Clematis albida* reminds the people to dig over the soil for the planting of potatoes, which is done in October [5]. According to the communication of a native, the Basutos reckon time by the changing of the seasons, the birth-times of animals, the annual variation and growth of plants, but also by the stars and the moon [6]. The most curious method is one common among the Hidatsa Indians, who reckon from the development of the buffalo calf *in utero* [7]. Such signs may also serve to mark off the longer seasons: the Tunguses begin summer with the time when the grayling spawns, and winter with the time when the first good squirrel is caught [8].

The examples hitherto given are only single instances intended to make clear the manner and signification of this method of indicating time. Similar starting-points for reckoning are afforded the whole year through, and as their times are

[1] Junod, *Thonga*, p. 20. [2] Junod, *Ronga*, pp. 196 ff. [3] Grabowsky, p. 102. [4] Sibree, p. 57. [5] Dieffenbach, II, 122 ff. [6] Sechefo, p. 931. [7] Matthews, p. 4. [8] Schiefner, p. 196.

fixed in regard to each other, they may form a sort of calendar. The statements made for the extremely primitive Andamanese give a very characteristic circle of occupations throughout the year, though here we have to do not with names of seasons but with the phenomena and business of the year, which our authority gives according to the European calendar. January: much honey; two kinds of wild fruit ripen and are gathered. February: two other kinds of wild fruit, also a tuber; the inhabitants of the coastal districts catch the dujong and also a few turtles; the older folk make out of bark turtle-nets, cables, and lines for harpoons. March: still another two kinds of wild fruit ripen, wild honey is abundant. April: many visits of neighbouring tribes; fruit is scanty, there is only one kind ripe, the honey is finished, the bread-fruit has not yet ripened. From May to August the ripe bread-fruit forms the principal food. In June many cases of death occur since the men in their boar-hunting expeditions in the forest sleep without shelter. In August certain white caterpillars which live in the decaying tree-trunks are a favourite dish. From August to October boats are built. In November the people are particularly merry. The turtle-catch is productive, the weather is pleasantly cool, there is little rain, and shelter is not necessary. Different tribes visit one another and feast and dance together [1].

How upon such a foundation a number of seasons may be built up is shewn by a comparison with an instructive account referring to the Eskimos of the Ungava district of Labrador. The seasons have distinctive names and are again sub-divided into a great number of shorter seasons. There are more of these during the warmer weather than in winter. The reason is obviously that the summer offers so many changes, and the winter so few. The chief events are the return of the sun, always a sign of joy to the people, the lengthening of the day, the warm weather in March when the sun has attained sufficient height, the melting of the snow, the breaking up of the ice, the open water, the time of birth of various

[1] Homfray, p. 62.

seals, the advent of exotic birds, the nesting of gulls, eider, and other native birds, the arrival of white whales and the whaling season, salmon fishing, the ripening of salmon-berries and other species of edibles, the time of reindeer crossing the river, the trapping of fur-bearing animals, and hunting on land and water for food. Each of these periods has its special name applied to it, although several may overlap each other. The appearance of mosquitoes, sandflies, and horseflies is marked by dates anticipated with considerable apprehension of annoyance [1]. The Eskimos of Greenland reckon from the winter solstice five moons until the time when the nights become so bright that it is impossible to reckon any longer from the moon. Then they reckon by the increasing size of the young of the eider-duck and by the ripening of berries, or along the sea-coast by the departure of the tern and the fatness of the seals; when the reindeer shed the velvet from their horns they know that it is time to move into the winter houses [2].

These smaller seasons have seldom developed into an annual cycle otherwise than among some agricultural peoples [3], unless they have been fitted into the larger seasons. This is the case with the western tribes of the Torres Straits, who also determine the seasons from the stars. In the counting of the seasons they commonly begin with *surlal* (mid-October to the end of November). This name is given to the turtles when copulating: while in this state they float on the sea and are readily caught. The constellation known as the Shark arises. Everything is dried up, the yams are ripe. The sounding of the first thunder is the sign for planting yams. *Raz* (December to February) is described as 'the time of death', i. e. the season when the leaves die down. The first part of this season is called in Mabuiag *duau-urma,* 'the falling of the cashew nuts'. There is an interval of fine weather and the wind is shifty: this coincides with Christmas-time. This is the time when the yams which have been planted begin to sprout. In Muralug this period is called *malgui,* which is the exact equivalent of our

[1] Turner, p. 202. [2] Dalsager, pp. 54 ff.; cp. Cranz I, 293 ff. [3] See below, pp. 66 ff.

word 'spring'. The next division is called *dob,* 'the last of growing things', or *kusikuki,* 'medusae of the north-west', the latter name being due to the large numbers of jelly-fish that float on the sea. The runners of the yams now grow. The time immediately after this is called *purimugo,* in Muralug *dpagap* or *keme.* The longer season following *raz* is *kuki,* (March to May), the time when strong winds blow intermittently from the north-west, accompanied by deluges of rain, and the time of the damp heat. The appearance of the constellation *dogai kukilaig* (Altair, together with β, γ *aquilae*) heralded the beginning of this season. It has the sub-divisions *kuki, kupa kuki,* and *gugad arai* . The dry season, *aibaud,* forms the remaining part of the year. The south-west wind, *waur,* blows steadily: for this reason the first part of this period is known as *waur* and perhaps merits a distinctive name as much as *raz.* It is marked by the appearance of the constellation *magi Dogai* (Vega with β, γ *lyrae*). Food is abundant and festivals are celebrated. The divisions of *aibaud* are *sasiwaur* ('child', i. e. lesser south-east), *piepe, tatu waur* ('father', i. e. greater south-east), and *birubiru,* a bird which at this time migrates from New Guinea to Australia [1].

The Kiwai Papuans who dwell on the opposite coast of New Guinea have the same star myths as the inhabitants of the Torres Straits Islands: for them, however, no smaller but only two greater seasons are mentioned [2]; on the other hand they have months [3]. The smaller seasons have clashed with the reckoning by moons, and have surrendered their names to describe the latter. They have therefore in great measure become merged in the counting of the months, which will be dealt with later. The greater seasons on the other hand, on account of their length, could not be merged in the reckoning by months, and these have therefore everywhere remained. The number of the longer seasons varies considerably, and is of course connected not only with the climatic conditions but also with the fundamental phenomena which

[1] *R. T. Str.,* pp. 226 ff. [2] Cp. below, p. 57. [3] Below ch. VI.

for one reason or another attract attention; a larger season may also be divided into two or three smaller ones.

It may be taken for granted that all peoples outside the tropics, even where it has not been thought necessary expressly to mention the fact, know the two larger divisions of the year, the warmer and colder seasons. Where the plants die in winter and the trees lose their leaves, or where the snow covers the ground, this great difference becomes especially pronounced and determines the whole mode of life: but even in the sub-tropical regions it is obvious enough. To it corresponds in many parts of the tropics and sub-tropical zones the natural division into a dry and a rainy season. For the division into the summer period of vegetation and winter with its snow and ice it is superfluous to give examples: the above-quoted description of the year of the Labrador Eskimos is a typical instance. Swanton and Boas state that certain Indian tribes of N. W. America divide the year into two equal parts of six months each, summer extending from April to September, and winter from October to March [1]. The Comanches reckon by the cold and the warm seasons [2]. I give a few instances from districts in which a winter of this nature does not exist. Among the Hopi of Arizona the year has two divisions — there seems to be no equivalent to our four seasons — which may be termed the periods of the named and the nameless months: the former is the cold period, the latter is the warm. They may also be called the greater and the lesser periods, since the former begins in August and ends in March [3]. The Zuñi of western New Mexico also divide the year into two periods of six months each [4]. The Chocktaw of Louisiana have the same number of seasons [5]. The natives of Central Australia have names for summer and winter [6].

In the tropics there is often only one rainy and one dry season, with two divisions of the year corresponding to these. On the Orinoco there are summer and winter, i. e. the dry and the rainy seasons. In Maipuri the dry season is called *camoti,* 'the glowing splendour of the sun', and the rainy season

[1] *Handbook,* p. 189. [2] Schoolcraft, II, 129. [3] Fewkes, *21* p. 19. [4] Stevenson, p. 108. [5] Bushnell, p. 17. [6] Spencer and Gillen, *Centr. Austr.,* p. 25.

canepó. Among the Tamanacho winter is called *canepó*, 'rain', 'rainy season', summer is *vannu*, 'crickets', since these insects chirp incessantly to the end of the season [1]. The Tupi have expressions for dry and rainy seasons but not for the year as a whole. The Bakairi reckon by the semesters of the dry and the rainy seasons [2]. The Karaya of Central Brazil reckon the year from one fall of the river to another. They thereby distinguish two seasons, the dry season when they live on the sand-banks, and the rainy season when they live on the upper banks of the river [3]. The Wagogo of E. Africa divide the year into two halves: *kibahu*, the dry season, about May—October, and *kifugu*, the rainy season, November to April [4]. So also the Nandi: *iwotet*, rainy season, March—August, and *kement*, dry season, September—February; [5] further the tribes of Loango [6], the Bantu tribes of the Congo State [7], and the Cross River negroes of the Cameroons [8]. The Tshi-speaking peoples divide the year into two periods: the smaller *hohbor*, from May to August, and the larger from September to April [9]. Among the Akamba the year consists of two rainy seasons separated by two dry periods: *ambua anzwa, ambua ua* [10]. Where this natural division prevails, however, the half-year is often put in the place of the year [11].

The Javanese have a dry and a rainy period which include six of their seasons [12], and so have the Islamite Malays of Sumatra [13]. The Polynesians divide the year throughout into two greater periods. Their seasons were in general two, the rainy season or winter, and the dry season or summer, but varied according to the situation of the particular group of islands north or south of the equator. On the Society Islands they embraced the months of May—November and November—May respectively. On the Sandwich Islands the rainy season, *hooilo*, lasted from about Nov. 20 to May 20, the dry season, *kau*, from May 20 to Nov. 20 [14]. We shall find later

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[1] Gilij, II, 14; von den Steinen, *Globus*, p. 244. [2] *Ibid.*, p. 245. [3] Krause, p. 339. [4] Claus, p. 38. [5] Hollis, *Nandi*, p. 94. [6] *Loango Exp.* III: 2, 139. [7] Torday and Joyce, *35*, p. 413; *36*, pp. 47 and 295. [8] Mansfeld, p. 244. [9] Ellis, *Tshi*, p. 215. [10] Hobley, *Akamba.*, p. 53. [11] Cp. below, p. 88 f. [12] Wilken, p. 197; cp. below p. 70. [13] Maass, p. 514. [14] Fornander, I, 118 ff.

that both seasons were named and regulated according to the visibility or invisibility of the Pleiades. Other writers also give information for Hawaii. When the sun moved towards the north, the days were long, the trees bore fruit, and the heat was prevalent: it was summer; but when the sun moved towards the south, the nights became longer and the trees were without fruit: it was winter [1]. *Kau* was the season when the sun was directly overhead, when daylight was prolonged, the trade-wind prevailed, days and nights alike were warm, and the vegetation put forth new leaves. *Hooilo* was the season when the sun declined towards the south, the nights grew longer, days and nights were cool, and the herbage (lit. vines) died away: each had six months. On Kauai Island the seasons were called *mahoe-mua* and *mahoe-hope* [2]. In Tahiti the bread-fruit can be gathered for seven months, for the other five there is none: for about two months before and after the southern solstice it is very scarce, but from March to August exceedingly plentiful. This season is called *pa-uru* (*uru* = 'bread-fruit') [3]. The recurring scarcity of bread-fruit shewed the changes in the course of the year, but the Pleiades afforded a surer limit [4]. In Samoa one authority gives the wet season, ending in April, and the dry season, which comes to an end with the palolo fishing in October [5]; another *vaipalolo,* the palolo or wet season from October to March, and *toe lau,* when the regular trade-winds blow, embracing the other months [6]; a third the season of fine weather — in which however much rain falls in some localities — and the stormy season, when it rains heavily [7]. The importance of agriculture is so great that the seasons in following it may sometimes depart from the changes of the climate. The Bontoc Igorot have two seasons which however do not mark the wet and dry periods, as might be expected in a country where these two periods occur: *cha-kon* is the season of rice or 'palay' growth and harvesting, *ka-sip* the remaining portion of the

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[1] Sheldon Dibble, p. 24. [2] Malo, pp. 53 and 57, note 2. [3] Forster, p. 436. [4] *Ibid.,* p. 371. [5] von Bülow, *72,* p. 239. [6] Brown, p. 347. [7] Stair, p. 37.

year [1]. In the New Hebrides the year is divided into two parts, the periods of yam-planting and harvesting [2].

In certain localities the atmospheric conditions are such that two divisions of the year may be distinguished according to the winds, as for instance in the Marshall Islands, where there are the months of calm and the months of squalls [3]. More commonly two seasons are given by the variation of the monsoons, as on the island of Bali, east of Java: in each case there were six homonymous months. The Kiwai Papuans have *uro*, the comparatively dry season of the south-east monsoon (April —December), and the time of the prevailing north-west wind, *hurama*, a period of alternating calms, storms of wind and rain, and thunder [4]. A native judge from the island of Vuatam in the Bismarck Archipelago remarked that the north-west trade blew throughout the time when the sun was southerly, that is from November to February, but during the time in which the sun moved in a northerly direction, May to August, the south-east monsoon prevailed. On Valam it is said that the south-east monsoon blows as long as the sun sets WNW, i. e. from May to August: from the month of November to February, when it sets WSW, the north-west trade blows [5]. In Rotuma or Granville Island near the equator periods of six months are reckoned. The west wind, which blows from October to April, serves to distinguish these two periods, although it does not affect the vegetation [6]. The people of the Nicobar Islands reckon by the south-west monsoon (November to April) [7]. The Benua-Jahun of the Malay Peninsula distinguish the half-year of the north monsoon and that of the south monsoon [8].

It would seem that the whole year might easily arise through the fusion of these two larger periods: that this is not the case will be shewn in the following chapter.

These half-years are as a rule well defined, but the natural conditions upon which they depend are subject to fluctuation, and in particular there are transitional periods the position of which cannot be certainly decided. Moreover smaller

[1] Jenks, p. 219. [2] Oliveau, p. 343. [3] Erdland, p. 21. [4] Landtman, communicated by letter. [5] Meier, pp. 708 ff. [6] Hale, p. 105. [7] Hastings, p. 132. [8] Skeat and Blagden, I, 393.

characteristic periods arise within the larger, and hence more seasons appear. Elsewhere the natural conditions are such that they directly lead to more than two seasons, e. g. where there are two different rainy seasons in the year. From these circumstances it becomes plain that a fluctuation between a larger or smaller number of seasons is possible, and indeed it often actually occurs. The seasons that adhere to natural phenomena are never clearly defined like a division of the calendar: the limits are uncertain, different seasons may be merged into one another or in part overlap one another, as has been shewn in the case of the Eskimos of Labrador.

Among the Eskimos of the Behring Strait the year is often divided into four seasons corresponding to the usual occupations, but these divisions are indefinite and irregular in comparison with the reckoning by months [1]. Of the Indians in general it is said that as a rule four seasons are recognised and have specific names applied to them (apart from the tribes that have two). In many cases however the latter may split up both summer and winter into two subdivisions: this is stated e. g. for the Chocktaw of Louisiana [2]. The Siciatl of British Columbia however have three: spring, summer, and winter [3]. The Thompson Indians of the same province group their months into five seasons, winter beginning with the first snow that stays on the ground, and lasting until its disappearance from the valleys, generally the 2d, 3d, and 4th months, spring beginning with the disappearance of the snow, and embracing the period of frequent Chinook winds, 5th and 6th months, summer 7th, 8th, and 9th months, early autumn (Indian summer) 10th and 11th months, and late fall which takes up the rest of the year [4]. The neighbouring tribe of the Shuswap recognise five seasons exactly corresponding to those of the Thompson Indians [5].

The natural phenomena from which the seasons are determined and named vary according to the geographical latitude, the nature of the country, and the mode of life, i. e. according as the tribe lives by hunting or by agriculture.

[1] Nelson, p. 234. [2] Bushnell, p. 17. [3] Hill Tout, *34*, 33. [4] Teit, *Thompson*, pp. 238 f. [5] Teit, *Shuswap*, p. 517.

Certain writers state that the Indians of Virginia divided the year into five seasons: the budding of spring, the earing of corn or 'roasting-ear time', summer or 'the highest sun', corn-gathering or 'fall of the leaf', and winter [1]. The Maida of northern California say that the seasons — the rainy season, the leafy season, the dry season, and the season of falling leaves — were instituted by Kodoyampeh, the Creator [2]. The Kiowa distinguished only four seasons: *saigya* or *säta,* considered to begin at the first snowfall; *asegya,* spring (the etymology of the word is unknown, a more recent name is *son-pata*, 'grass-springing'), which begins when grass and buds sprout and the mares foal; *paigyá,* summer (*pai,* 'sun'), which begins when the grass has ceased to sprout and lasts until fires become necessary in the *tipis* at night; *paongya,* autumn (the thickening of the coat or fur, *pa,* of the buffalo and other animals), sometimes called 'the time when the leaves are red', begins when the leaves change colour [3]. It is to be noted that these seasons must be of very different length. In the same way the Dakota reckon five months each for winter and summer and only one month each for spring and autumn, but it is expressly mentioned that this reckoning is not strictly followed [4]. The Pawnee divided the year into a warm and a cold period, and also into the four seasons, each of which however was normalised to three months [5]. The account of the Comanches is somewhat indefinite: they have no computation of time beyond the seasons, which are reckoned by the rising height of the grass, the fall of the leaves, and the cold and the hot season. They very seldom reckon in new moons [6]. They have the four seasons therefore. The Indians of Chile have words for our four seasons [7].

The above-mentioned names of the five seasons are those of the Algonquins of Virginia [8]; the Occaneechi of the same district call them: — the budding or blossoming, the ripening, midsummer, harvest or fall, winter [9]. Certain agricultural tribes of the east divided autumn into early autumn, when the leaves

[1] *Handbook,* p. 189. [2] Powers, p. 294. [3] Mooney, *Rep.,* p. 370. [4] Riggs, p. 165. [5] Dunbar, p. 1. [6] Schoolcraft, II, 129. [7] Molina, pp. 319 ff. [8] Beverley, p. 181. [9] *Ibid.,* p. 4.

change colour, and late autumn, when they fall, but denoted the two periods by entirely different names [1]. Agriculture is responsible for the adding of a fifth season to the four arising from the warm and the cold periods and the times of transition between these [2]. But other transitional periods between the longer seasons also arise independently [3]. The Lapps have names for the four ordinary seasons, but their language also contains compounds like 'spring-winter', i. e. late winter, — a compound also known in Swedish (*vår-vinter*) — and 'autumn-summer', i. e. late summer [4]. The Lapps of Västerbotten divide the year into *sjeunjestie,* the dark period, and *tjuoikestie,* the bright period. They also have four seasons: — *dalvie,* winter, from the freezing of the lakes till the melting of snow; *geira,* spring, time of snow-melting and spring floods; *gese,* summer, from the time when the earth becomes visible to the fading of the grass; *tjatj,* autumn, from this time until the lakes begin to freeze again. The Lapps speak also of *talve-qvoutel,* mid-winter, *kese-qvoutel,* midsummer, and *tjaktje-kese,* late summer [5].

The Yukaghir of N. E. Sibiria use more often the names of periods or the seasons of the year than the names of the months. They have six seasons. The limits of these seasons can hardly have corresponded in former times to fixed dates. Being at present baptized, they reckon the seasons of the year according to the Greek-Orthodox holidays; and thus we have the following seasons: — 1, *puge,* summer, from St. Akulina to Mary's Day, 13th June to 8th September; 2, *nade,* autumn, from the 8th of September to St. Michael's Day, 8th of November; 3, *cieje,* winter, from the 8th of November to Purification, 2d of February; 4, *pore,* first spring, from Purification to St. George's Day, 23d of April; 5, *cille,* the second spring, from the 23d of April to the beginning of snow-melting, usually to St. Nicholas' Day, 9th of March; the name denotes the icy surface forming during the night on the snow, after having melted during the day, and is also given to a month; 6, *conjile,* the third spring, from the snow-melting period to St. Akulina's Day [6].

[1] Mooney, *Rep.,* p. 366. [2] Cp. below, p. 73. [3] Below pp. 72 ff. [4] Wiklund, p. 5 [5] Drake, p. 278. [6] Jochelson, *Yukaghir,* p. 42.

Africa offers good examples of the fluctuation and further sub-division of the seasons. The Wagogo of East Africa divide the year into the dry season, about May to October, and the rainy season, November to April. In the latter they further distinguish the little rainy season, *songola,* November and December, and the greater one, *itika,* about February and March [1]. In the neighbourhood of Mombasa the great rains begin in April and last approximately for a month, *mwaka* or *masika: mchoo* is a week in August, and *vuli* a fortnight in November, with showers. Beyond the seasons the natives have little idea of the lapse of time [2]. The Wa-Sania of British East Africa have three periods of four months each, *gunu, adolaia,* and *huggaia,* but no explanation whatever of these names is given [3]. The Masai divide the rainy season into three periods, and also have four seasons of three months each: — (1) *ol dumeril,* the time of the lesser rains, preceding that of the great rains. The latter fall in (2) *engokwa,* named after the Pleiades, which at that time *rise* low on the *western* horizon (*sic!*). Then follows (3) *ol airodjerod,* the season of the gentle after-rains, and then (4) *ol ameii,* the time of hunger and drought [4]. Hollis begins the list with the months of the showers, and calls the season of the great rains *l'apaitin le-'l-lengon,* 'the months of plenty', stating that the latter season, in which the setting of the Pleiades takes place in the evening, is called from these *loo-'n-gokwa* [5]. Among the Ewe tribes the year has three periods: — *adame,* March to June; *keleme,* July to October; *pepi,* November to February. In the first two much rain falls, so that work in the fields is greatly hindered. Inland the year begins in March with the yam-sowing, and ends in February. The three principal seasons include four months each. Inland *keleme* also includes another period *masa,* September and October, the second maize-sowing. Hence the name 'masa-corn'. *Pepi* is the harmattan time, in which fall yam-harvesting, grass-drying, and hunting [6]. The Yoruba divide the year into the dry season, the season of the harmattan wind, and the rainy season, the last-named being further divided into

[1] Claus, p. 38. [2] Johnstone, p. 266. [3] Barrett, p. 35. [4] Merker, p. 155. [5] Hollis, *Masai,* pp. 333 ff. [6] Spieth, p. 312 and note.

the time of the first rains and that of the last rains or 'little rainy season' [1]. In Loango a dry and a rainy season of about 6 months each are distinguished. In many districts there is also a third season *tschimuna,* the time of the ripening of favourite fruits etc., and the hot seasons are then often simply called *bimuna* [2].

Where two rainy seasons separated by dry seasons occur, a fuller division of the year presents itself. The Babwende have five seasons: — *ntombo,* from the first rains at the end of September or beginning of October to the ceasing of the great rains at the end of January; *kianza,* the lesser dry season, to the beginning of the great rains in February; *ndolo,* the latter part of the rainy season up to *sivu,* the dry season, which begins in June; and *mbangala,* in August and September, when the grass withers and is burnt up [3]. The Wadschagga count: — the great rainy season, 4 months; the time of dew, 2 months; the season of heat, about 2 months; the so-called lesser rainy season, 1—2 months; the great heat, about 3 months [4]. The seasons of the Banyankole are determined by the rains. The longer period is termed *kyanda* and usually has six months: the lesser, *akanda,* has four, and there are two months called *itumba.* During the six months very little rain falls, then come a few days of rain followed by four months of dry weather, and after that two other months of rain [5]. A very striking example of the crossing and overlapping of the seasons is afforded by the Bakongo. They have *sivu,* the cold season, at the beginning of the dry season which commences about May 15; *mbangala,* the dry season with little or no dew, July to the middle of October, including also *mpiaza,* the grass-burning season, second half of July, August, and September; *masanza,* early light rains, latter part of October, November, and December; *nkianza,* short dry season, most of January and the early part of February; *kundi, nsafu,* fruit season, end of February to May, including *kintombo,* heavy rains, March, April, and *nkiela,* the time when the rains cease, from the beginning to the middle of May [6].

[1] Ellis, *Yoruba,* p. 151. [2] *Loango Exp.,* III: 2, 139. [3] Hammar, p. 156. [4] Gutmann, p. 240. [5] Roscoe, *Bantu,* p. 139. [6] Weeks, p. 308.

In the inland districts of Madagascar, in the neighbourhood of Antananarivo, there are properly only two seasons, a hot rainy period from the beginning of November to the end of April, and a cold dry period during the other months. However four seasons are distinguished: — *lohataona,* 'head of the year', September and October, when the rice is planted and a few showers fall; *fahavaratra,* 'the thunder-time', from the early part of November to the end of February or into March; *fararano,* 'the last rains', from the beginning of March to the end of April; and *ririnina,* 'time of bareness', when the grass becomes dry, June to August. Rice is planted twice, first before the end of October and again in November or December; the first crop is ripe in January or early in February, the second about April; the two crops however are not clearly distinguished and together last about four months [1]. One name for winter is *maintang,* 'the earth is dry' [2].

The Hottentots seem to keep in view the vegetation rather than the climate. Their seasons are four in number. First, early spring. When with increasing warmth, independently of the rain-fall, trees and bushes break into leaf, and in good years winter or early spring rains have revived the grass, spring or blossoming-time has come; it begins in August and ends in October. The following season, which in the upland Damara dialect is called 'the sun-time', embraces the first half of the hot period in which, when the year is good, the so-called lesser rains fall. If these are wanting, or, as is usually the case, are scanty, the land is for the most part desolate, without grass or herbage. This time of drought is described by the same word as the drought itself: it prevails from October to December inclusive. The season upon the productiveness of which the welfare of the Hottentots in the main depends may be called the pasture-season: it includes the period of the greater rains and the time immediately after this, when the fodder has not yet lost its freshness. It fills, loosely speaking, the period January—April, and constitutes summer and early autumn. Winter, or the cold sea-

[1] Sibree, pp. 53, 57. [2] *Ibid.*, p. 77.

son, May to August, embraces two-thirds of autumn and the first half of winter [1]. The Herero also have four seasons: — spring (from September onwards), summer, autumn or the rainy season, and winter [2].

In Burmah there are three seasons, though certainly they are regulated by the months: the cold season, the hot season, and the rainy season [3]. The Polynesians usually have two long seasons, but three are not unheard of. A native of the island of Molokai, in the Sandwich group, states that there the year was divided into three seasons: — *maka-lii, kau,* and *hoo-ilo. Maka-lii* was so called because the sun was then less visible, being obscured by clouds, and the days were shortened. *Kau* was so termed because tapa could then safely be spread out to dry. *Hoo-ilo* meant 'changeable' [4]. The two main seasons are called *kau* and *hoo-ilo*. It is to be observed however that in a notice from Hawaii they are called *hoo-ilo* and *maka-lii* [5]. This shews that the number is not fixed. On the Society Islands besides the two seasons regulated by the Pleiades there were also three seasons: (1) *tetau,* autumn or season of plenty, the harvest of bread-fruit, commencing with December and continuing until *faahu,* which corresponded to January and a part of February, the time of the most frequent rains, comprising three months; (2) *te tau miti rahi,* the season of high sea, November to January; (3) *te tau poai,* the longest season, winter, the season of drought and scarcity of food, which usually extended from July to October [6]. It will however be seen that these seasons do not fill up the year, and that the second partly covers the first. Their names are taken from different phenomena of Nature. The New Zealanders distinguish four seasons: — spring, *te aro aro, mahana, te toru,* 'the time of growth', both *toru* and *aro aro* signify 'the shooting or springing forth of plants', *mahana* is the season of warmth; summer, *raumati, waru, rehua, — raumati* means 'dead leaves', and the summer is so called because all the trees with one exception are evergreen and shed their leaves in summer; autumn, *ngahura matiti;* winter, *hotoke, puanga,* the season when the

[1] Schulze, p. 369. [2] Irle, p. 224. [3] Nisbet, II, 288. [4] Malo, p. 60, n. 8. [5] *Ibid.,* p. 58, n. 5. [6] Ellis, *Polyn. Res.*[3], I, 87.

earth is damp and gives forth her worms, which were formerly highly prized as food[1]. The seasons are regulated by the stars, *puanga* is the great winter star, *rehu* the great summer star.

The names of the greater seasons are therefore taken for the most part from the varying phases of the climate, but very often refer also to the phenomena of natural life accompanying these. The climatic phases, on account of their fluctuating duration and their limited number, afford no means of distinguishing and naming a greater number of smaller seasons: the phases of plant and animal life may be used as an equivalent and are much better adapted to this purpose, especially when to them are added the regular occupations of agriculture. In the above examples terms referring to natural life have already been found mingled with those borrowed from the climate. Where the seasons are numerous this is always the case: direct references to the climate may even be entirely lacking. These facts shew moreover that between the largest and smallest seasons there exists no difference in the main: they pass into one another without interruption through a series of intermediate stages. Such smaller seasons may be run together into the circle of the year; but this seldom occurs, since the ordinary reckoning according to lunar months has absorbed the smaller seasons, which, on account of their varying and indeterminate length, are inconvenient for reckoning, whereas the regular and definite length of the months makes them easy to reckon. It is however sometimes the case.

The Indians in general have lunar months named from natural occurrences, but not so the Luiseño of Southern California. According to P. S. Sparkman in his unpublished Dictionary of their language the Luiseño year was divided into 8 periods, each of which was again divided into two parts, distinguished as 'large' and 'small' or 'lean'. These divisions did not represent periods of time but merely indicated when certain fruits and seeds ripened, grass began to grow, and trees came into leaf in the valley or on the mountain. The

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[1] Taylor, pp. 361 ff., 364 ff.

native names are given but are unfortunately not translated. Du Bois, to whom we are indebted for this information, names the parts 'months' (in inverted commas), and adds that the names are all taken from the physical features of different seasons. *Tausunmal,* about August, means that everything is brown and sear. *Tovukmal* refers to the little streams of water washing the fallen leaves. *Tasmoimal* means that the rain has come and grass is sprouting. In *nemoimal* the deer grow fat. The 'months' are marked by the rising of certain stars. The seasons have here developed into a regular calendrical cycle [1].

In reality this cycle is in no way distinguished from the succession of seasons given above: it has only been improved and regulated. This happens more particularly under the influence of agriculture; one can speak of an agricultural year the seasons of which are determined and named in accordance with agriculture. Of the Fanti of the Gold Coast it is said that they divide the year, according to the changes of the climate, into nine parts with distinct names, beginning with the harmattan wind in January and ending with the small tornadoes in December [2]. The periods however are related to agriculture, as appears from a detailed description for the countries around the Niger. The end of the rainy season and the beginning of the dry (about November) forms a kind of season by itself, and is called *odun* (year). The farmers go on weeding their farms to give the crops of their second harvest a chance. The dry season is divided into two sections of two months each. During the day it is very hot. The cold wind blowing from the east is called *harmattan* by Europeans, *oye* by the natives. The second crops of corn, beans, and guinea-corn are now gathered. The land is cleared for the next season's crops, and the bush already felled is burnt. This is also the fishing season. The dry season *(erun)* continues for the next two months, but during the latter part of the second month the rumbling of thunder is heard and small rains fall. The preparation of the ground is continued and

[1] Du Bois, p. 165. [2] Mac Donald, p. 64.

yam-planting begins. The rainy season may be divided into two parts separated by a little dry season: the first section consists of five lunar months of rain, the latter of two lunar months, one nearly dry month intervening. The first two months of this section of the rains are called *asheroh ojo:* it is the tornado season. At the beginning of this season ground-nuts and the first crop of corn are planted. In the next two months the rain-fall reaches its maximum. Towards the end of the second month it becomes possible to eat new corn. The main crop however is left standing in the fields until it becomes quite dry, which happens when the next season, the little dry season, sets in. This sub-division of the rainy season is called *ago,* probably because the corn has grown tall during the last month. The season called *awori* consists of one month of rain and the little dry season. The first crop of yams, the corn, the ground-nuts, and the gourds are gathered in. Before long the rains have ceased, the seed for the second crop of corn is sown. The two following months are called the *arokuro* season, and like the first two months of the rains they are tornado months. Bushes are felled in order to prepare the land for next year's sowing, and weeding is continued [1]. The months mentioned are lunar months. An interesting feature is that the names of the seasons do not altogether coincide with the natural divisions of the climate, as the following comparison clearly shews: — *odun,* end of rains, beginning of dry season; *erun,* dry season I, II, 4 months; *asheroh ojo,* season of rains (tornadoes), 2 months; *ago,* rainy season, maximum, 2 months; *awori,* 1 month rain and little dry season; *arokuro,* season of rains (tornadoes), 2 months. The deviations are brought about, as the description shews, by the business of agriculture.

The Shilluk know the months but also divide the year into the following nine seasons: — *yey jeria,* about September, harvest of red dura; *anwoch,* about October, end of the harvest, people are waiting for white dura to ripen; *agwero,* about November—December, harvest of white dura begins;

[1] Dennett, pp. 130 ff.

wudo, December to January, harvest of white dura continues; *leu,* January—February, the hot season, *dodin,* about March, in these two there is no work in the fields; *dokot,* about April, 'mouth of rain', beginning of the rains; *shwer,* about May—July, time for planting red dura; *doria,* about July—September, beginning of harvest [1]. A similar but more indefinite mode of reckoning seems to exist among the Bakairi of S. America, of whom it is said that they reckon by dry and rainy seasons, and also distinguish 'months' not by the moon but quite vaguely by the rain and the heat and the phases of the maize-culture [2]. Their months are given as follows: — 'hardest rain', about January; 'less rain', February; 'rain ceases', March; 'it (the weather) becomes good', April; 'wood-cutting', May and June; July, nameless; 'end-of-the-day-time', August; 'the rain is coming', September and October; 'the maize ripens', November; December, nameless [3].

The agricultural year is most clearly defined among the rice-cultivating peoples of the Indian Archipelago, by whom the seasons are determined according to the state of the rice. It is said, for example, in speaking of an event, that it happened at the blossoming or harvesting of the rice [4]. Among the Bahau, a Dyak tribe of Borneo, the year is divided into eight periods according to the various kinds of labour carried on in the rice-field: — the clearing of the brushwood (to prepare the fields for cultivation), the felling of the trees, the burning of the wood felled, the sowing or celebration of the seed-time festival, the weeding, the harvest, the conclusion of the harvest, the celebration of the new rice-year [5]. The Bontoc Igorot, as has been mentioned, divide the year into two parts, the period of rice-culture and the other period. There are however other periods which vary in different villages as regards name, number, and duration, but are everywhere called after the characteristic occupations that follow one another in the course of the year. Eight of these together make up the calendar, and seven of them have to do with the rice-cultivation. Each period receives its name from the occupa-

[1] Westermann, p. 103. [2] von den Steinen, *Globus,* p. 245. [3] Hastings, p. 69. [4] Wilken, p. 199. [5] Nieuwenhuis, I, 161.

tion which characterises its beginning, and keeps this name until the beginning of the next period, even when the occupation that characterised it had ceased some time before. To *cha-kon* belong: — (1) *i-na-na,* the first period in the year, the time, as it is said, of no more work in the rice sementeras, when practically all the fields are prepared and transplanted; in 1903 it began on Feb. 11 and it lasts about 3 months, continuing until the time of the first rice-harvest in May, in 1903 till May 2; (2) *la-tub,* the time of the first harvests, lasts about four weeks and ends about June 1; (3) *cho-ok*, the time when most of the rice is harvested, fills about 4 weeks, in 1903 till July 2; (4) *li-pas,* the season of 'no more palay-harvest', lasts for about 10 or 15 days. To the half-year *ka-sip,* belong: — (5) *ba-li-ling,* which takes its name from the general planting of camotes and is the only one of the calendar periods not named from the rice industry: it lasts about 6 weeks, or nearly to the end of August; (6) *sa-gan-ma,* the time when the sementeras which are to be used as seed-beds for the rice are put into condition, the earth being turned three several times, lasts about 2 months: on Nov. 15, 1902 the seed was just peeping from the kernels; the seed is sown immediately after the third turning of the earth, which thus ended early in November; (7) *pa-chog,* the period of seed-sowing, begins about Nov. 10; although the seed-sowing does not last many days, the period continues for 5 or 6 weeks; (8) *sa-ma,* the last period, in which the sementeras are prepared for receiving the young plants, and in which these seedlings are transplanted from the seed-beds, lasts nearly 7 weeks, from about Dec. 20 to Feb. 10. The Igorot often say e. g. that an event occurred in *la-tub* or will take place in *ba-li-ling;* they therefore keep these periods in mind just as a European thinks of some particular month in which an event has happened [1]. The greatly varying length of the periods is once more to be noted, and also the fact that a vacant season is made into a period (see e. g. under (7), it being necessary to fill in the gaps so that the circle shall be continuous.

[1] Jenks, pp. 219 ff.

How such seasons and the year formed out of them may be developed under the influence of the improved calendar into periods of definite numbers of days is shewn by the Javanese peasant calendar which is still used in Bali and Java. The year is an embolimic year of 360 days and is divided into 12 periods of unequal length. These are: — *koso,* 41 days; *karo,* 23; *katigo,* 24; *kapat,* 24 (25) [1]; *kalimo,* 26 (27); *kanam,* 41 (43); *kapitu,* 41 (43); *kawolu,* 26 (in leapyear 27); *kasongo,* 25; *kasapuluh,* 25 (24); *dasto,* 23; *sodo,* 41. The first ten of these names are the ordinal numerals of the Javanese vernacular, the last two, according to Wilken, are corruptions of Sanskrit words. In Bali the year begins with the eleventh season (April), in Java with the winter solstice. The different divisions correspond to the following occupations and natural events: — 1, the falling of the leaves, burning of dry grass, and cutting of trees for the cultivation of mountain rice; 2, beginning of vegetation; 3, blossoming of wild plants, planting of yams and other secondary crops; 4, rutting season, high winds, the rivers swell; 5, preparations for rice-planting; 6, ploughing and rice-sowing; 7, rice is planted, the canals are repaired; 8, rice grows and flowers; 9, the seeds form in the rice-plants; 10, rice turning yellow; 11, the rice-crop is ripe, harvest begins; 12, cold weather begins, the harvest is finished and the rice housed. This is almost literally translated from the language of the natives [2]. Wilken gives to certain periods a different number of days (see note 1); according to him the year has 365 days, but every fourth year is a leapyear with 366 days. The calendar was regulated in 1855 by Pakoe Boewånå III, naturally according to the Gregorian calendar: hence the variation from Crawfurd's statements. This is the only instance of an attempt to bring a natural calendar into agreement with the demands of a modern one; it is however unpractical and inconvenient on account of the varying length of the divisions. It is still used in eastern Java and in the Tengge mountains [3].

In China, besides the lunisolar type of year, there is a division of the year into 24 parts, the names of which corres-

[1] The figures in brackets represent the number of days as given by Wilken. See below. [2] Crawfurd, I, 297 ff. [3] Wilken, p. 197.

pond to the climatic phenomena but are also borrowed from the phenomena of natural life. They are: — rain-water, 15 days; moving of snakes, 15 days; spring equinox, 15 days; pure brightness, 15 days; sowing-rain and dawn of summer, together 31 days; little fruitfulness (Ginzel) or little rainy season (d'Enjoy), corn in the beard, together 31 days; summer solstice, 16 days; beginning of heat, 16 days; great heat; signs of autumn, together 31 days; end of heat, white dew, together 31 days; cold dew, 15 days; autumn equinox, 15 days; hoar-frost, 15 days; signs of winter, 15 days, beginning of snow, great snows, together 29 days; winter solstice, 15 days; little cold, 15 days; great cold, 15 days; dawn of spring, 15 days [1]. Of this division Ginzel says that among the Chinese the seasons are expressed by a division of the ecliptic: they are therefore astronomical, the Chinese have no special names for the physical seasons. In former times they took the length of the astronomical year to be 365 1/4 days, and assumed an equal period for the course of the sun in the ecliptic; but they afterwards learnt to calculate the beginning of the divisions directly. It would be surprising however not to find underlying the present divisions old seasons which the astronomical knowledge has drawn within its scope, and which have thus been systematically developed and regulated. To decide the matter would require special knowledge which the present writer does not possess. It is to be noted moreover that the periods are connected in pairs, the odd numbers (according to Ginzel's scheme) are called *tsie*, the even *k'i*, the joint name being *tsie-k'i*.

As far as the Indo-European period is concerned it seems now to be agreed that there were then three seasons: for only the roots occurring in the words *hiems*, *ver*, and *summer* recur in a greater number of the Indo-European languages. The much criticised statement of Tacitus about the Germans is therefore corroborated: "They know and name winter and spring and summer, but are ignorant of the name and the goods of.

[1] D'Enjoy; Ginzel, I, 467. The latter begins the list with the commencement of spring and gives dates. The number of days is in each case taken from d'Enjoy.

harvest"[1]. Spring however is not equivalent to the other two seasons, for Indo-European antiquity certainly also divided the year into two parts, the cold and the warm seasons. The question whether the primitive Indo-European tribe had two or three seasons is therefore pointless, and that this is so will be readily understood by anyone who has become familiar with the overlapping and the instability of the seasons of the primitive peoples. The same phenomenon repeats itself in the addition of a fourth season. The Greeks complete the circle of the year with the three seasons winter, spring, and summer (*χειμών, ἔαρ, θέρος*), but in Homer the fruit-harvest, *ὀπώρη*, already appears with the pretensions of an independent season. Alkman has these four[2]. The principle of nomenclature is however different: the first three names are derived from climatic phenomena, *ὀπώρα* from the fruit-harvest. Now since four climatic periods are naturally to be distinguished — cold, warmth, and two transitional periods — the logical consequence is that the fourth season should also be referred to the climate, and indeed to the still unnamed period of transition between summer and winter. This period however does not coincide with *ὀπώρα*, but follows it. The latter term is therefore corrected to *φθιν-* or *μετόπωρον*; the *ὀπώρα* naturally persists as the fruit harvest, and Theophrastus[3] counts it in addition to the other four and thus gets five seasons. The same thing seems to have happened in the case of the Latin *autumnus*, although the process cannot be demonstrated. If the small seasons are included the circle may be still further extended. Thus the pseudo-Hippocratean treatise *Περὶ ἑβδομάδων*[4] gives seven seasons: — 1, seed-time, *σπορητός*, from the early rising of the Pleiades to the winter solstice; 2, winter, until the late rising of Arcturus; 3, tree-planting, *φυταλιά*, up to the spring equinox; 4, spring; 5, summer, from the early rising of the Pleiades up to that of Sirius; 6, fruit-harvest, *ὀπώρα*, until the early rising of Arcturus; 7, autumn. This arrangement is cer-

[1] *Hiems et ver et aestas intellectum et vocabula habent, autumni perinde nomen et bona ignorantur* — Tac., *Germ.*, ch. 26; Schrader, II[3], 223 ff.; Feist, p. 265. [2] Fragm. 76 Bergk. [3] *De sign. temp.*, 21, 44, 48. [4] Roscher, p. 84; the limits according to Galen, XVII A, 17.

tainly affected by the septenary system which pervades the treatise, but is founded on a popular basis: the smaller seasons, which otherwise pass into the greater, are given an independent position by the side of these. The system has not prevailed, it is true, but it affords a typical example of the instability of the seasons.

Exactly the same process recurs in the Indian seasons. The natural division of the North Indian year is into three periods — a warm, a rainy, and a cold season. Three corresponding seasons are the most usual in the Vedic period, and these are still the popular divisions in the Punjab. Later two transitional periods are interpolated, one of an autumnal character between the rainy season and the cold season, and a warm period between the cold season and the hot. These five seasons often occur in the Brahmanas. The well-known six seasons — *vasanta*, spring; *grishma*, hot season; *varsha*, rainy season; *śarad*, autumn; *hemanta*, winter; *śiśira*, cool season: the cold season is divided into two periods — are the result of a systematic comparison with the months, the latter being distributed in pairs among the seasons. By this arrangement the rainy season is the loser, since it embraces at least three months. There is also a second sexpartite division of the year, not indeed mentioned in the Vedic literature but better corresponding to the course of the seasons, in which the rainy season is divided into two periods [1].

The splitting up of the seasons persists to this day among the Germanic peoples; but a systematising of these small seasons is only found when they are referred to the Julian months. This point will be dealt with below, in chapter XI. The phenomenon is known to me from my own native district. The word *höst*, 'autumn', still persists there in the old literal sense of harvest, mowing, and indeed *höhösten* is particularly the hay-harvest. Hence the designation of the autumn season as *höst* is felt to be insufficiently accurate and the term is replaced by *efterhöst*, literally 'after-harvest', late autumn. Between summer and *efterhöst* appears the *skyr* (dialect for *skörd*), the

[1] Thibaut, pp. 10 ff.; Ginzel, I. 315.

harvest, as a fifth season; sometimes there is added a sixth season, *sivinter,* late winter. Little attention has been paid to this phenomenon, though it is common enough. The periods of the rural occupations in particular give rise to such terms. Any period of this nature is described by the old Swedish word *and* (*ann*), now obsolete except in dialects. For the other districts I add from the Dialect Dictionary of Rietz: — *hobal,* the period on the one hand between the tillage in spring and the hay-harvest, and on the other between the hay- and the corn-harvest, the former period being the greater, the latter the small *hobal.* Elsewhere the word has the form *hovel,* summer being divided into *hoveln, mellan-anna* and *ann* (which is here used pregnantly to mean harvest). Compounds with *and* are *vår-, säs-, gödsel-, hö-, slått-, skår-, skyr-,* and *sädes-and* (periods of spring, sowing, manuring, hay, hay-harvest, harvest, corn). The North Frisians of Amrum and Föhr for instance mark events by the periods *um julham* ('at Christmas'), *um wosham* ('in early spring'), *pluchleth* (ploughing-time), *meedarleth* (hay-harvest), *kaarskörd* (corn-reaping). In Norway there are current as general time-indications: — fishing-time *(fiskja),* springtime *(voarvinna* or *voaronn),* ploughing-time *(plogen* or *plogvinna),* midsummer *(haavoll* or *haaball),* 'between time', i. e. between ploughing and hay-making, *(mellonn),* early summer *(leggsumar),* haymaking-time *(høyvinna, høyonn,* or *slaatt),* harvest-time *(haustvinna* or *skurd),* 'shortest-days-time' *(skamtid)* [1]. In Iceland, where the sheep-farming is the principal industry, we find: — Lamb-weaning time or Pen-tide, *stekk-tid,* in May; Parting-tide, *fra-faerar,* when the sheep are driven to the hills; Market-tide, *kaup-tid,* when all purchases for the year are made; Home-field hay-time and Out-field hay-time (July and August); Folding-tide, *rettir* (September), when the sheep are driven off the hill pastures into folds to be separated into flocks and marked. Again from wild birds and eider-ducks one calls the spring Egg-tide. The fisherman uses such seasons as *ver-tid,* Fishing-tide; of these there is a spring, an autumn, and a winter fishing-month. Flitting-days, *fardagar,* come

[1] Weinhold, *Mon.,* pp. 2 ff.; cp. I. Aasen, *Norsk Ordbog.*

in the spring, and *skil-dagar* in summer, when servants leave. [1] In the old German laws and elsewhere similar time-indications are common, e. g. at plough-time, at the second plough-time, at autumn-sowing, at harvest, at hay-making time, at hemp-gathering, after harvest and hay-making, at the bean-harvest, at plough-time, at the grape-harvest, at sowing-time, at harvest-time, fall of the leaves, sprouting of the leaves, oat-cutting or -harvest [2]. In Anglo-Saxon a similar expression occurs in a law of King Vihtraed in the year 696, *sexton dæge rugernes* (rye-harvest). These periods are in themselves indefinite, they fail to achieve a definite length or quite fixed position in the year. Where they do so, this is due to the comparison with the Julian months, of which more later.

However over the number of the seasons among the Germans or, what has often been regarded as the same thing, — and this is an evidence of the false methods by which the problem has been attacked — over the German division of the year, a long and vigorous dispute has been carried on. That the year was divided into two parts, summer and winter, is well known. I refer to the Scandinavian half-years [3], to the testimony of Bede [4] that the Anglo-Saxons reckoned six months for winter and six for summer, and to the German expressions for a year: 'in bareness and in leaf', 'bare and leaf-clad', 'in straw and in grass' [5]. No less a scholar than J. Grimm has cast doubt on the statement of Tacitus that the Germans had only three seasons, but later he withdrew his doubts in view of the consideration that the Germans at the time of Tacitus were acquainted with grain-culture but not with fruit-culture, and that the word autumn, harvest, referred to the fruit and vine-harvests and therefore naturally did not appear among the Germans of that time [6]. In view of the linguistic phenomenon mentioned above, p. 71, it seems now to be agreed that the account of Tacitus

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[1] Vigfusson, I, 431. [2] *In der brache, in der zwibrache, in der herbstsat, in der erne, im houwet, im hanfluchet, ze afterhalme und houwe, in der bonenarne, im brâchet, im wimmot, in der sât, ip dem snite, laubbrost, laubrîse, haberschnitt, habererndte.* Tille, p. 10; cp. below, ch. XI. [3] Cp. below pp. 78 ff. [4] *De temp. rat.*, ch. 13. [5] *Im rîs und im lôve, im rûwen und im blôten, bî strô und bî grase.* [6] Grimm, I, 74.

is in the main correct. Weinhold has given the treatment of the question its direction. According to him the tripartite division to which reference has been made crowded out the older division into two parts, the points of division, he maintains, doubtless coinciding in the first instance with the three *Landdinge* or *ungebotene Gerichte* (regular courts), which are found as early as the time of Charlemagne. The beginnings of the four seasons — determined from saints' days — in February, May, August, and November are of foreign origin: on the other hand the quadripartite division of the year, arising from the fact that mid-winter and midsummer were added to the beginning of winter and summer as interpolations in the time-reckoning, is German. This Weinhold tries to prove from the popular festivals associated with these dates. The attempt however is a complete failure. No season begins with any of the solstices, on the contrary these fall right in the middle of a season. His thesis rests on an erroneous conception of the festivals, viz. that they are in general calendar-festivals. Under primitive conditions a festival (the harvest-home in particular) may certainly conclude a division of time and may thus also indicate the beginning of a new season, but as a rule the festivals, though regulated by the calendar, are not so ordered that they coincide with the beginning of a season. We are therefore not authorised in drawing conclusions as to the beginning of a division of the year from the existence of an old festival. Support has been lent to the idea of Weinhold by the fact that in later times the beginnings of the seasons were indicated by festivals and saints' days. The fact of the matter is that the common medieval calendar was composed of a series of festivals and saints' days from among which suitable and well-known days were chosen in the dating of the beginnings of the seasons also. For the general understanding it was necessary throughout to bring in popular saints' days [1]. Tille attacks Weinhold very sharply but remains throughout under the influence of the method indicated by the latter: his

[1] Pfannenschmid, *Germanische Erntefeste*, Hanover, 1878, maintains that the quadripartite division was developed alongside of the tripartite, and bases his statement on a study of the principal festivals.

work, however, has its good points, inasmuch as it refers to economic conditions, agriculture, the payments of rent, etc. The bipartite division, he asserts, is primitive Indo-European, the tripartite is of foreign (Egyptian) origin: both existed for a long time side by side. This fact is explained by an old sexpartite division of the year, since the six seasons could be run together either in twos or in threes. The beginnings of the half-years are given by natural phenomena, those of the three annual divisions are placed by Tille at March 13, July 10, and Nov. 11, old style: in the north on account of the climatic conditions they are pushed back a month. Hammarstedt [1] remarks very pertinently that the beginning of winter in November, in the north in October, belongs to the reckoning in half-years, and that hence arises the absurdity that Tille has to give Feb. 10 as the date for the beginning of spring in the north. But to assign Dec. 13 with Hammarstedt as the beginning of one of the three seasons agrees just as little with the natural seasons of the year.

The principal error lies in the systematising, the seasons being regarded as periods of a definite number of days. This is not the case even to-day, and still less was it so, as we have seen, among primitive peoples. Still more clearly does the same error of method appear in Tille's assumption of a sexpartite division of the year, or of sixty-day periods, as they are expressly termed. He refers to the six old Indian seasons, which are a comparatively late and artificial product called forth by the adoption of the names of the seasons in the reckoning by months [2], and to the pairs of months of the Syrian and Arabian calendar. He regards as 60-day divisions not only the smaller seasons mentioned above, p. 75, the duration of which was originally no less indefinite than it is to-day, but also the Germanic pairs of months, which owe their origin to an adaptation of the Roman months (for this see below, ch. XI). The 60-day periods are so far from being primitive that they first

[1] *Om en nordisk årstredelning*, p. 248. I cannot however agree with the author in the direction indicated by the sub-title of his essay: "Is a trace of an old Germanic tripartite division of the year to be observed in our popular festivals?" [2] Above, p. 73.

took their origin under the influence of the reckoning in months.

In Iceland there still exists a curious calendar, the 'week-year'. The year is divided into two halves, *misseri;* the people reckon in so many *misseri,* not years; it consists of *whole* weeks, in the ordinary year 52 (= 364 days), in leapyear 53 (= 371 days). Until midsummer (or mid-winter) they reckon forwards, so many weeks of summer or winter have elapsed, after that backwards, so many weeks of summer (winter) remain [1]. Bilfinger in a penetrating study has tried to shew that this curious calendar is an outcome of the ecclesiastical calendarial science of the Middle Ages. He does not however prove his case: rather, the calendar, as tradition shews, reaches far back into heathen times [2].

The reckoning in weeks was once common to all Scandinavia. The Lapps have special names for every week of the

[1] For exceptions see Bilfinger, I, 8 ff. [2] Bilfinger has brought forward his opinion with great penetration and wide learning, but his reasoning cannot stand before a searching criticism such as that amassed by Ginzel, III, 58 ff., and Brate, *Nordens äldre tideräkning,* Program of the Södermalm College, Stockholm, 1908, pp. 17 ff., and in particular developed and more profoundly based by Beckman, *Alfræði,* Intro. pp. 1 ff.; cp. an article by the same author in the Norwegian periodical *Maal og Minne,* 1915, p. 198. I might content myself with a simple reference to Beckman, since I agree with him on all important points, but as his article is written in Swedish and is therefore probably inaccessible to many, I add the following note which in the main was written long before it now appears, originally in connexion with my studies in the primitive history of the Christmas festival, worked out in the year 1914.

In point of fact it seems as though the objection which Bilfinger in his study of the Yule-tide festival, II, 120, note, makes against the criticism of Finnur Jonsson has not been answered (before Beckman): the objection is that no notice is taken of the fundamental idea of Bilfinger's work on the Old Icelandic year — the cardinal point around which his whole demonstration revolves — viz. the relation of the Old Icelandic calendar to the calculation of Easter. Granting that the still heathen Icelanders or Norwegians knew the week (the Germanic peoples took over the week while yet in their heathen period, see my *Studien zur Vorgeschichte des Weihnachtsfestes,* Archiv f. Religionswiss., 19, 1918, p. 118) and made use of it in counting time, and that they later learnt approximately to know the length of the year — which is very easily conceivable in view of their lively intercourse with other nations — we have the elements out of which their calendar was developed, viz.

year, borrowed from festivals and saints' days falling within the weeks; they have therefore taken from the Scandinavians

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the week and the year. To these must be added the old-established divisions of the year, summer and winter, which, on account of their importance for civil life, were introduced as fixed periods of time into the calendar. As a result of the adjusting of the reckoning in weeks to the year of 365, in leapyear 366, days, there arose a week-year with periodic interpolations of an embolimic week. This of necessity agrees with Bilfinger's so-called 'mean Easter year', since both are constructed out of the same elements, it being assumed only that the week-days of the one calendar correspond to those of the other, and this is the case, since the week came to Iceland from the south. Bilfinger is not correct in calling (I, 71) the shifting Easter period a fragment of a week-year: in so doing he shuts his eyes to what he himself terms the quinary factor, i. e. that Easter Sunday falls varyingly on one of the five Sundays between March 22 and April 25 (the other days of the Paschal term being fixed accordingly). This fact, as has long ago been observed, makes the Easter period a fragment of a lunisolar year. A further development would lead to a lunisolar year that also took into account the reckoning in weeks. Bilfinger's view of the matter is that the Icelanders for the sake of convenience eliminated the quinary factor from the Easter reckoning by taking the mean Easter Thursday as a fixed point of departure instead of letting the calendar follow the actual variation of this day: this roundabout method is unnecessary since the same result is arrived at by basing a system of time-reckoning on the year and the week. The aim of the Icelandic calendar, according to Bilfinger, was to fix the beginning of summer, a legally very important term. If this was the object in view it was, as Brate remarks (p. 21), not attained, for this day, Thursday of the week April 9—15, may fall in the Passion week so that it becomes useless for all business purposes. This proves on the contrary that the fixing of the beginning of summer is pre-Christian.

The last objection to Are's account of the introduction of the Icelandic calendar, which Finnur Jonsson and Brate have allowed to stand, must also fall. According to Are the cyclical interpolation of a week was introduced by Torsten Surt about 960 A. D., while previously the year had 52 weeks, i. e. 1 1/4 days too few. Bilfinger objects that such a year is unthinkable, since in the course of 40 years it must anticipate itself by 50 days, and therefore in 292 years must have run through the whole circle of the seasons: the mid-winter festival must therefore for one generation have fallen in summer. Theoretically the objection is valid, but in practice not so (cp. the Egyptian shifting year), and the old calendars are administered practically. In the effort to arrive at an embolimic cycle mistakes are at first made, and the agreement with the solar year is once more brought about by means of intercalations irregularly introduced for practical reasons. How the ancient Roman calendar was treated we know: by the end of the Republic it had become thoroughly disorganised

the reckoning in weeks and adapted it to the uses of a primitive time-reckoning. From the same source they have also derived the special significance of the summer night (April 14, Tiburtius) and of the winter night (Oct. 14, Calixtus), from which also two weeks are named. The system is better preserved in certain parts of South Sweden [1]. The people count in *räppar*, quarter-years — in Öland they are called *trettingar*, thirteenths, i. e. 13 weeks — beginning with the *räppadagar:* these are Lady Day, Midsummer Day, Michaelmas Day, and Christmas Day, old style. Just as in Iceland, they reckon backwards, not however in the same quarters as there, but in the quarters before Midsummer and Christmas: in the other two quarters they count forwards. In northern Scania I have met with a relic of the same type of reckoning, the 'number of weeks' *(ugetalet)*, which begins on April 6 (Lady Day, old style), and is reckoned backwards as far as the thirteenth week. The duration of both

as a result of intercalations made for political purposes. Moreover the Roman year with its average length of 366 ¼ days was from the beginning not a whit better than the year of 364 days ascribed by Are to the Icelanders before Torsten Surt. We learn from inscriptions that in Athens still more irregular intercalations were made during the last decades of the 5th century. Such intercalations are the ruin of any system, but chronology must work with a system, and this fact often blinds the eye of the chronological student to the irregularity in the practical treatment of the calendar. Irregular intercalations of this kind are not indeed attested for Iceland, but it is evident that they must always appear of themselves in a defective calendar. The possibility of a treatment of this kind existed, since the spokesman of the laws had to proclaim publicly every year to the assembled people in the Althing notices about the calendar for the following year, among which the announcement of the intercalation held a special place. In these arguments I find myself in agreement with Beckman: I also agree with his statement as to the gradual increase in accuracy in the formation of the Icelandic week-calendar under the influence of the ecclesiastical calendar.

We conclude then that the cardinal points of the Icelandic calendar, which recur throughout Scandinavia and fall about three weeks behind the equinoxes or the solstices, are not of Christian origin: the agreement with what Bilfinger terms the 'mean Easter Thursday' is accidental. The date is due to climatic conditions. A contributory factor may have been the circumstance that mid-winter and midsummer fall just at the places where a shortening or lengthening of the day becomes observable.

[1] Småland and neighbouring provinces. Communicated by Dr. von Sydow.

rural occupations and natural phenomena is determined in so many weeks. As the starting-point of this reckoning in weeks the four great festivals which come nearest to the four points of the solstices and equinoxes are chosen. There can be no doubt that these have made their appearance under the influence of the Christian calendar instead of the four Old Scandinavian points of division of the year. The people call Calixtus' day (Oct. 14) the first day of winter, and Tiburtius' day (April 14) the first day of summer; many rune-staves have this division of the year, and almost all describe the former by a tree without leaves, the latter by a tree in leaf. They fall in the same weeks as the initial days of winter and summer in Iceland, which vary there on account of the peculiar arrangement of the calendar. In Scandinavia, however, they have been transformed into fixed days under the influence of the Julian calendar.

It is a natural conclusion that the reckoning in weeks had its origin in the use of the rune-staff. Since the week-day letters on these are repeated the whole year through, the weeks offered an easy means of reckoning. This conclusion is certainly correct, but still we may venture to ask why the week-day letters were admitted into the national calendar by the North especially, and why the reckoning in weeks should be adopted in popular use only there. The reason can only be that the counting in weeks was already in use before the rune-staff was introduced. This mode of counting, which in Iceland had been developed into a curious form of year, was in Scandinavia adapted to the Julian calendar and remained bound up with this. The leap-week was therefore unnecessary. The old basis is however still preserved in the points of departure, the summer and winter nights. It is the same system as the Icelandic, built up on the week and the year, but differently modified: the idea of any borrowing cannot be entertained. The basis of this calendar, therefore, was once common to all Scandinavia, and the calendar must go back to heathen times.

Under the influence of the popular lay astrology the week was early spread among the Germanic peoples: on it and on an approximate knowledge of the length of the year, such as

could easily be acquired in the lively intercourse with Christian lands during the Viking period, the system of the Icelandic calendar is built up. An indigenous element however appears, the half-year reckoning, and indeed the great probability is that the limitation of the half-year to a fixed number of days was first achieved as a result of this systematising of the calendar. Winter and summer, like all natural seasons, had at first no fixed limits. The quarters arose in the course of the reckoning, the people counting forwards in the first half of the half-year and backwards in the other half. The middle points of the half-year, mid-winter and midsummer, fell where both reckonings met. This agrees with the popular objection to high numbers. The Germanic tribes of the south, in accordance with their milder climate, commonly reckoned five months for winter. In the north the dead season is longer, about six months, and this fact has contributed to the half-year reckoning which, as has already been remarked, is widely characteristic of northern peoples. That the limits between both seasons were unstable and could be moved forward according to circumstances is in my opinion shewn by the names of the initial days of the half-year — *sumarmál* (plural) and *vetrnaetr*, 'the winter nights'. Where a definitely determined day is in question the plural is out of place: it is used to describe a period, for instance *jol* (plur.) denotes Christmas-time [1].

With the two opening days of the calendar and the one division in the middle are often combined the three great sacrificial feasts, the autumn festival at the winter nights, the Yule festival at mid-winter, and the spring festival at the summer nights. It is true that the first of these festivals, which was celebrated at the beginning of a period of rest after the completion of the harvest and agricultural labour, denoted, as such festivals often do, the conclusion of the old year and the beginning of the new. That it was fixed for a definite day cannot be demonstrated any more than that the festival of victory in spring, celebrated before the Vikings went forth on their voyages, fell exactly on the summer night. On the contrary the

[1] This practice has passed into the Lapp language: *kess idja* = week of the summer nights, *talvidja* = the winter nights. Wiklund, pp. 16 and 20.

time probably varied according to circumstances: the expression of Snorre lacks calendarial accuracy and remains indefinite: — "They should sacrifice against the winter to get a good year, and at mid-winter sacrifice for germination; the third sacrifice in summer, and this was a sacrifice of victory" [1]. In historical times the Yule festival is regulated by the Christian calendar; Snorre says that in heathen times it was celebrated at the *hökku* night, but of this we have no certain knowledge. Things happened as in the Middle Ages and later: after a calendar has arisen the festivals are regulated by this, but they are not calendar-festivals, and in reconstructing the scheme of the calendar from the festivals very great caution must be exercised.

Our conclusion is that the Germanic seasons, like the seasons in general, were not in themselves definitely limited divisions of time, and that alongside of the greater seasons smaller ones arose without there being any numerical determination of the relationship between the two. Seasons only become divisions consisting of a definite number of days when in the regulation of the calendar they are taken over as calendar divisions, as winter and summer were in Scandinavia. Where a calendar has arisen directly out of the seasons, the divisions, like the seasons, are of varying length [2]. This also shews that the Germanic seasons first attained a definite number of days through the calendar-regulation introduced from abroad. Further, when a calendar existed, the beginning of the seasons could be given with reference to this: the day varied according to circumstances, but the choice was limited in this manner, viz. that only a popular festival or saint's day was appropriate as a distinguishing day. Here also, therefore, the calendar was the starting-point for the regulation of the seasons. A division of the year in the more accurate sense also first arose through the regulation of the calendar, since, owing to the method of calculation, the middle days of the half-year divisions

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[1] *Þá skylldi blóta i móti vetri til árs, enn at miðjum vetri blóta til gróðrar; hit þriðja at sumri, þat var sigrblót — Heimskringla,* Ynglinga-saga, ch. 8. [2] See e. g. above, p. 70.

became distinguishing days in the calendar. When the calendar came, the old festivals were also regulated by it.

By way of supplement two or three curious exceptional cases may be noted. A completely isolated instance is offered by the Bangala of the Upper Congo, who count in lunar months, and, since there is no dry season, reckon for longer periods by the rise of the rivers [1]. In the monsoon districts however it is frequently a peculiarity to distinguish the seasons by the winds. Of Sumatra it is reported: — The principal seasons are named after the quarters of the heavens from which the wind blows. At the time when we were in Taluk, April to mid-June, the south monsoon was blowing; the east, the west, and the north monsoons also come under consideration for the seasons. Moreover the people also distinguish a dry and a rainy period. The seasons 4. *tahun djin*, 5. *tahun wou*, 6. *tahun sai* were regarded as falling within the rainy period, while the dry season set in with 1. *t. ali*, and continued with 2. *t. dal-awal*, and 3. *t. dal akhir*. In the two seasons 7. *t. ha* and 8. *t. 'am* dry and wet weather alternate [2]. In New Britain (Bismarck Archipelago), between the two greater seasons of the south-east and the north-west monsoons, each consisting of 5 months, there were two smaller intermediate seasons of one month each, the period of variable winds and the period of calm [3]. In Songa (Vellalavella), one of the Solomon Islands, various seasons are distinguished according to the direction of the wind: — the time of the west wind, *nanano;* the time of the almond-ripening, *tovarauru* (the time of the north wind); *rari*, the time of the south wind — during this period calm prevails at night but there is wind in the day-time; *sassa nanano*, time of the east wind; *mbule*, time of calm, lasting about a month. After *mbule* follow *tovaruru*, lasting about 2 months, and *sassa nanano*, one month. In Lambutjo the matter

[1] Coquilhat, p. 367. [2] Maass, p. 514. The names are those of the Arabic letters and also denote the years of an eight-year cycle, the years of which are said to be characterised by similar weather. The people are Islamite Malays. Astrology and the calendar have strongly influenced Sumatra and in particular Java; primitive modes of thought however recur under the surface. [3] Brown, p. 331.

is still further complicated. The following winds are distinguished: — south wind, west wind, good wind at the time of almond-ripening, lasting about one month. Further the east wind, strong or quite weak with squalls, not good. Three months afterwards comes the west wind, lasting about 2—3 months. After the east wind a south-west wind, very strong, at that time one cannot sail on the sea: it often comes 5 months after the east wind. After the south-west wind a SE wind, lasting only 1—2 weeks. Then strong E wind, lasting 1—2 months, during which time navigation in canoes is impossible. Then again a time of 'clear water', i. e. calm, lasting two months. After this, S wind, NW wind, and NE wind. Each of these lasts only a short time, altogether they occupy 3—4 months. Then begins a lighter E wind, lasting 3—4 weeks. Then about one month of light W wind, then again stronger E wind for 1—2 months. Afterwards S wind for 1 $^1/_2$ — 2 months, lighter SE wind for 1—2 weeks, and then again stronger E wind for 2—3 months. At the time of the west wind there is much rain, at the time of the east wind much sunshine [1]. It is very interesting to see how accurately primitive peoples observe Nature, but these are not indications of time. On the Gazelle Peninsula it has been observed that when the SE monsoon blows the sun comes up in the east, and when the NW monsoon blows it rises in the south: the wind comes from the opposite direction to that in which the sun rises [2].

[1] Thurnwald, p. 346. [2] *Ibid.*

CHAPTER III.

THE YEAR.

Following the practice of my authorities I have often in the foregoing pages made use of the expression that the year is 'divided' into so many parts. From a genetic stand-point this expression is incorrect, because the time-indications, which relate to a concrete phenomenon of Nature, are older than the year, and, since they are connected only with the single phenomenon, are discontinuous or even indefinite. Only through their union does the complete year arise. Every natural year however offers on the whole the same phenomena following one another in definite succession, and thus the circle of the year has its prototype in Nature herself. Nevertheless the uniting of the different seasons into a complete year only takes place gradually by means of a selection, systematising, and regulation of the seasons. It must be carried out according to a principle — we shall see that this is as a rule the lunar reckoning — but the occupations of agriculture also serve as a handle. The present chapter will shew how the uniting of the seasons into the year is only a late and incomplete development, how originally the year does not exist as a numerical quantity, the *pars pro toto* counting being resorted to, and finally how the years are not reckoned as members of an era but are distinguished and fixed by concrete events.

The difficulty of struggling through to the conception of the year is exemplified by certain peoples who know two seasons but reckon in half-years without joining them together. Naturally this happens in the rare case in which there is very little difference — or none at all — between the two halves of the year. Thus of the Akikuyu of British East Africa it is

reported: — The equatorial year has no winter or summer. Its passage is marked by two wet seasons, which occur in what are our spring and autumn. The planting is done in all cases at the first commencement of the rains, and harvesting as soon as the crop has ripened after the cessation of the rain. There are therefore two seed-times and two harvests in twelve months, and when the native speaks of a year he means six months [1]. This is very natural, since by 'year' a vegetation-period is often to be understood: the half-year reckoning however also appears where a difference between the two seasons does exist. In Rotuma or Granville Island the inhabitants reckon in periods of six months or moons. The west monsoon, which blows from October to April, doubtless serves to distinguish these seasons: otherwise the difference between the seasons is hardly perceptible; the island lying near the equator. The half-years each contain six months, to which the same names are given in both halves [2]. The people of the Nicobars reckon in monsoon half-years, *shom-en-yuh,* the SW monsoon, *sho-hong,* blowing from May to October, and the NE monsoon, *ful,* from November to April, so that two of these form one of our years [3]. The half-years are also said to contain seven months each [4]: in reality they must vary between 6 and 7 months, as the year varies between 12 and 13. In New Britain (Bismarck Archipelago) there are monsoon years of five months: the two intervening periods of the variable winds and of the calms, each lasting one month, are not counted [5]. It is said that the Benua-Jahun of the Malay Peninsula have no other division of the year than the natural one of the north and south monsoons, each of which they call a 'wind-year', *satahun angni;* however a word for year, *sa taun,* is also ascribed to them [6]. In Bali the year is divided into two seasons or monsoons, each of which includes six months; since the months of both halves have the same names it is evident that originally only half-years existed [7]. The greatest unit of time among the Orang Kubu of Sumatra is the six-month *mussim* (season), which is of Malay

[1] Routledge, p. 40. [2] Hale, p. 105. [3] Hastings, p. 132. [4] Swoboda, p. 22. [5] Brown, p. 331. [6] Skeat and Blagden, I, 393. [7] De Backer, p. 406.

origin [1]. The Samoans have a name for a period of twelve months, but they formerly reckoned years of six months *(tausanga);* each of these corresponded to one of the two six-month periods, the palolo or rainy season and the monsoon season [2]. The Moanu of the Admiralty Island name the division of the year according to the position of the sun. When it stands north of the equator, the season in question is named *morai in paiin* (sun of war), since wars are chiefly fought in this season. When it stands over the equator, the season is called *morai in houas* (sun of friendship), the season of friendship and mutual visits. When the sun turns towards the south, the cooler season begins [3]. Of the Kiwai Papuans of the islands in the delta of the Fly River in New Guinea, Torres Straits, Landtman writes to me that he cannot say if the people are clear whether they reckon in years or in half-years [4]. The former supposition is really only supported by the fact that they are aware that the same natural conditions recur after the lapse of the two half-years. There is no word for year. On the whole it may be said that they count only the months, and hardly conceive of so great a unit as the year, nor even (at least not everywhere) of the half-year, although there may be a hint of this in special cases.

Not seldom the dry and the rainy seasons are counted without being combined into a year. This is expressly stated of the Tupi of Brazil and certainly applies also to the Bakairi [5]. In Loango there are dry and rainy seasons, and in many districts a third season also, the fruit-ripening. Commonly the people reckon by the two main seasons. A centenarian is therefore fifty years old [6]. In Uganda there are in the course of twelve months two rainy and two dry seasons, although there is hardly a month in which no rain falls at all. The rainy season from February to June is called *togo mukazi,* since the rain then falls without much thunder: the second, from August to November, is called *dumbi musaja,* because of the thunder and the frequent deaths from lightning. The dry season about

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[1] Hagen, p. 154. [2] Brown, p. 347. [3] Parkinson, p. 378. [4] Cp. p. 57. [5] Above, p. 55. [6] *Loango Exp.,* III: 2, 139.

December is more intense than that about June. However the year, *mwaka*, is composed of one rainy season together with the following dry season, and consists of six moons or months [1]. Their year, corresponding to a half-year, consists of five moons, and a sixth in which it rains [2]. In north Asia the common mode of reckoning is in half-years, which are not to be regarded as such but form each one separately the highest unit of time: our informants term them 'winter year' and 'summer year'. Among the Tunguses the former comprises 6 ½ months, the latter 5, but the year is said to have 13 months; in Kamchatka each contains six months, the winter year beginning in November, the summer year in May; the Gilyaks on the other hand give five months to summer and seven to winter. The Yeneseisk Ostiaks reckon and name only the seven winter months, and not the summer months [3]. This mode of reckoning seems to be a peculiarity of the far north: the Icelanders reckoned in *misseri*, half-years, not in whole years, and the rune-staves divide the year into a summer and a winter half, beginning on April 14 and October 14 respectively. But in Germany too, when it was desired to denote the whole year, the combined phrase 'winter and summer' was employed, or else equivalent concrete expressions such as 'in bareness and in leaf', 'in straw and in grass' [4].

'Years' with less than twelve months are to us the strangest of phenomena. The Yurak Samoyedes and probably the Tunguses of the Amur reckon eleven months to the year, the Kamchadales only ten, of which one is said to be as long as three [5]. The natives of southern Formosa reckon about eleven months to the year [6]. The inhabitants of Kingsmill Island, which lies under the equator, reckon periods of ten months, which are numbered but, in contradistinction to the other examples, are reckoned in cycles [7]. In the Marquesas 10 months formed a year, *tau* or *puni*, but the actual year, i. e. the Pleiades year, was also known [8].

[1] Roscoe, *Baganda*, pp. 37 ff. [2] Id., *Bantu*, p. 72. [3] Schiefner, pp. 191 ff. [4] See above, p. 75. [5] Schiefner, pp. 198, 201 ff. [6] Wirth, p. 211. [7] Hale, pp. 106, 170. [8] Mathias G., p. 211.

The Yoruba reckon in 16-day divisions. Fourteen of these form their old year, of 224 days, i. e. in former times attention was paid to the rainy season only. The first thunder was the signal for the fishers and hunters to come back to their huts and begin farming again [1]. The Toradja of the Dutch East Indies reckon in moon-months: two to three months however compose a vacant period in which they do not trouble about time-reckoning [2]. The Islamite Malays of Sumatra distinguish *tahun basar*, the great year, or *tahun musin*, the year of the seasons, both reckoned as 12 months, from *tahun padi*, the rice-year, which among them counts only eleven months [3]. The Dusun of British North Borneo have two methods of reckoning their longest divisions of time. If the native be a hill-man he will reckon by the *taun kendinga* or the hill-*padi* season, six months from planting to harvest, if a plain-dweller by the *taun tanau* or wet *padi* season, 8 to 9 months [4]. This incomplete year is therefore a vegetation year in which the vacant period of no work is simply passed over. In this manner may be explained the much discussed ten-month year of the Romans [5], if it really depends upon old tradition and is not a mere creation of spurious learning. It is not a cyclical year like ours: a complete explanation will be given below in the investigation of the manner in which the years were counted.

It is true indeed of most primitive peoples, as is said of the Hottentots, that they are well acquainted with the conception (*sic!* I should have said rather: the concrete phenomenon) of the year, *guri-b*, as a single period of the seasonal variation, but do not reckon in years in this sense [6]. That is to say the year is by them empirically given but not limited in the abstract: above all it is not a calendarial and numerical quantity. Of the Waporogo it is said: — Somewhat more difficult (than the times of day) is the conception of the year. Only older, more intelligent people have a clear idea of it, the sowing-time and the rainy seasons constituting their points of reference. But they too can only reckon up a few

[1] Dennett, pp. 136 ff. [2] Adriani and Kruijt, II, 264. [3] Maass, p. 512. [4] Evans, *JRAI, 42*, p. 395. [5] Mommsen, *Röm. Chronologie*[2], pp. 47 ff.; bibliography in Ginzel II, 221 ff. [6] Schulze, p. 369.

years (though they certainly do this by counting the seasons, cp. below, p. 92), and for the great mass of the people the conception of the year does not exist [1]. The Bontoc Igorot has no idea of a cycle of time greater than a year, and in fact it is the rare individual who thinks in terms of a year [2]. The length of the year consequently varies. Among the Banyankole it begins with the first heavy rains and lasts until the next heavy rains, so that a year may be longer or shorter by a few days: it is a matter of no consequence whether it is a week or even three weeks that are taken off or added to the length [3].

With the agricultural year it is just the same. For the Dyaks of Borneo the rice-harvest is a main division of the year *(tujelo)*; in September after the conclusion of the harvest the year is at an end; a definite beginning, a New Year's Day, is unknown [4]. The translation of a Ho-text runs: — "When the inhabitants of the interior begin to cultivate the yam-fields they begin a new year: when the yams are dug up and the dry grass is burnt away, a year has passed" [5]. Among the Thonga the notion of the year *(lembe, dji-ma)* is extremely vague: the year begins at two different periods, that of tilling and that of harvesting the first-fruits. They do not make any difference between a lunar and a solar year [6]. A very significant account comes from Dahomey. The word for year does not denote any definite number of months: the sense is rather 'to plant maize and eat, to plant it again and harvest it'. At the end of the harvest the year also is at an end [7].

Here therefore we have a natural year quite concretely and empirically given. Chronologically it is of no use nor indeed is it used: what method is resorted to will be shewn below. Attention must first be called, however, to an important point. The purely natural year is a circle which has no natural division, i. e. no beginning or end, the seasons following upon each other immediately; not so the agricultural year, which has both beginning and end. Here therefore there is a natural point of division, a new year, which appeared in some of the

[1] Fabry, p. 224. [2] Jenks, p. 219. [3] Roscoe, *Bantu*, p. 140. [4] Grabowsky, p. 102. [5] Spieth, p. 311. [6] Junod, *Thonga*, II, 282. [7] Foa, p. 120. In these districts there are two seed-times and two harvests in the year.

examples just given, and this is an extremely important point for time-reckoning. The vacant period between harvest and sowing presents some difficulty, and so both of these periods can be used as the beginning, as is done among the Thonga: otherwise the beginning of the year varies considerably, just because it can be arbitrarily determined [1].

The contradiction between length or duration of time and time-reckoning evidently here becomes apparent. The counting is not performed by means of these fluctuating empirical years, but the *pars pro toto* method is employed, the years are counted by a season. As soon as it is said that some event took place at a definite time of the previous year, or will take place at some point in the following year, a counting of the years is thereby implied, although for an enumeration of this kind the conception of the year is not necessary. When it is said that something happened at the previous harvest, or will happen at the next dry season a counting of the years is no less implied, although seasons are reckoned instead of years, i. e. the *pars pro toto* method is used. Thus it is, in fact, with all primitive and many highly developed peoples, and that not only when an event that took place at a definite time is spoken of, but also where the number of years alone is in question: in the latter case the reckoning is only performed from a favourite, conventionally selected season. The statement made for the Hottentots is significant for the kind of reckoning just mentioned. They keep in mind the age of their cattle from the calving and lambing periods [2]. Similarly we are told of the modern Arabians that the female camel is covered for the first time when she is four *rabi* old (*rabi* = the pasture-season in spring, when the camel foals), so that she foals in the fifth rabi [3].

As a basis for the counting either a longer or a shorter season may serve, or indeed any popular natural phenomenon of regular annual occurrence. Thus of the Chinhwan of Formosa it is stated that they have no calendar: they only know that a new year has come when a certain flower blooms again [4]. The Paez of Columbia have a word *enzte,* 'fishing, summer, year', since a great fishing is only engaged in once a year, in

[1] See below ch. X. [2] Schulze, p. 369. [3] Musil, p. 256. [4] Kisak Tamai, p. 97.

January or February [1]. In the language of the Tupi of S. Brazil the year is always called *akayú,* cashew-tree, which blossoms once a year, and produces a much-prized reniform stone-fruit which is also often used in the preparation of wine: the word also means 'season'. This tree bears fruit only once a year, whence it comes that the Brazilians reckon their age by the stones, laying aside one for each year, and keeping them in a small basket reserved for this purpose [2]. The Algonquin of Virginia reckoned in *cohonks,* winters; the name refers to the wild geese, and shews that these have come back to them so many times [3]. In medieval Swiss charters time is often reckoned in *louprisi,* 'leaf-fall'; *dri, nün louprisi* = when the leaves have fallen three, nine times, etc. [4].

In a later section on the beginning of the year we shall find that the appearance of a certain constellation, in particular the Pleiades, gives the signal for the beginning of the agricultural labour, whence is developed the importance of this date as the opening of the year. The time between two like appearances of the same constellation, e. g. between two heliacal risings, is a year. In this manner the name of the constellation itself can come to denote 'year'. In many parts of S. America the same word means both 'Pleiades' and 'year' [5]. The inhabitants of the Marquesas call the year of 12 months, as distinguished from the 10-month fruit-year, by the name of the Pleiades, *mata-iti* [6]. How easily this comes to pass is shewn by a statement made for the Bangala of the Upper Congo. The culmination of the constellation *kole* gave the principal planting-season. This was so familiar to the natives that the informant used the word *kole* as equivalent to the word 'year' [7]. This is in its very nature a *pars pro toto* designation, since it refers to an annually recurring phase of the stars.

More often the years are reckoned by one of the greater

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[1] von den Steinen, *Globus,* p. 246, n. 1. [2] *Ibid.,* p. 245: the last detail quoted from C. de Rochefort, *Hist. naturelle et morale des Iles Antilles,* Rotterdam, 1663, p. 56. [3] Beverley, p. 181. [4] Grimm, I, 85; Weinhold, *Jahrt.,* p. 12. [5] von den Steinen, *Globus.* [6] Mathias G., p. 211. [7] Weeks, *JRAI, 39,* 129.

seasons. It is a well-known fact that in Old Norse generally, in Gothic, and often in Old German and Anglo-Saxon time was reckoned in winters. We find traces of the same practice in Greek (*χίμαρος*, 'a one-year-old goat', from the same root as *χειμών*, winter) and in Latin (*bimus, trimus* = 'of two, three years', from *hiems*): poets often reckon in *hiemes* [1]. It is almost the rule among all peoples who live under a climate that has a winter with snow and ice. The Ostiaks reckon in winters, and so do the Eskimos of Greenland [2] and of the Behring Straits [3], and the N. American Indians in general, for instance the Kiowa [4], the Pawnee [5], and the Omaha [6]. The common method of reckoning is not by the season, 'the cold time', but by the concrete phenomenon that distinguishes it, viz. the snow. So with the tribes of the N. W. interior [7], the Hupa [8], and the Dakota, who say that a man is so many 'snows' old, or that so many 'snow-seasons' have passed since an occurrence [9]. The Siciatl of British Columbia reckon either by summers, 'fine seasons', or by winters, 'snows' [10]. For the Algonquin see p. 93. In the tropics to reckon by the cold season is rare: the Guarini of Paraguay however reckon in *roi*, i. e. 'seasons of coolness', 'winters' [11], and the Bakongo occasionally by *sivu*, the cold season, though more often by *mou*, 'season' [12]. The reason for the reckoning of the years in winters is the same as that for the counting of the days in nights. Winter is a time of rest, an undivided whole, which practically becomes equivalent to a single point: it is therefore more convenient for reckoning than summer, which is filled up with many different occupations. In the south of N. America, in the states on the Gulf of Mexico, where the snow is rare and the heat of summer is the dominant feature, the term for year had some reference to this season or to the heat of the sun [13], e. g. among the Seminole of Florida the name for the year was the same as that used for summer [14]. Here the summer is the time of rest, but in Slavo-

[1] Schrader, II [2], 227; Feist, p. 266. [2] Cranz, I, 293. [3] Nelson, p. 234. [4] Mooney, *Rep.*, p. 366. [5] Dunbar, p. 1. [6] Fletcher and La Flesche, p. 111. [7] Carver, p. 175. [8] Powers, p. 77. [9] Mallery, *4*, p. 99. [10] Hill Tout, pp. 34, 33. [11] von den Steinen, *Globus*, p. 245. [12] Weeks, *Bakongo*, p. 308. [13] *Handbook*, p. 189. [14] Mac Cauley, p. 524.

nic also time is reckoned in summers (*leto* = 'summer', plural = 'years'). We may compare here the English expressions 'a maiden of 18 summers', etc. The reckoning in springs is only exceptional. The Basuto word *selemo* means 'spring, ploughing-time, year' [1]. At the southern end of Lake Nyassa time is reckoned by 'rains', i. e. rainy seasons [2].

Ever since the principal food of man has been the produce of fruit-trees or the corn, the fruit- and corn-harvests and the whole period of vegetation in general have been of decisive importance for his well-being. We have already seen how this circumstance has left its mark upon the indications of the seasons, and in the same way the second most important method of counting years is to reckon by harvests or vegetation-periods. The fellahs of Palestine still do this. Their usual method is to reckon from one harvest to another, or, as they put it, 'from threshing-floor to threshing-floor' [3]. In modern Arabia rents are hardly ever reckoned for a whole year, but only until the next spring, *rabi*, when the young animals are sold, or, as by the fellahs, until the next threshing-time, *bedar*, when the farmer can realise upon his corn [4]. The Negrito of Zambales determine the year by the planting or harvesting season, but their minds rarely go back farther than the last season [5]. In Bavaria in the Middle Ages the years used to be reckoned in autumns. The ceremonial reckoning in the Sanskrit ritual texts is in autumns, Sanskrit *çarád*, 'autumn' [6]. The subjects of the Incas had a word *huata*, 'year', which as a verb meant '*attacher*': but the lower classes reckoned in harvests[7]. This is also done in the district around Mombasa [8]. The Arabs sometimes reckon the years as e. g. 40 *charif*, *charif* being the time of the date-harvest [9].

We have already spoken of the rice-year in the East Indian Archipelago as a combination of the agricultural seasons; the period of vegetation of the rice also serves, although seldom, for the counting of the year. Among the Toradja the time needed for a plant to come to its full development up to maturity is called *ta'oe*, and *santa'oe* accordingly means 'a year

[1] Sechefo, p. 932, note 1. [2] Stannus, p. 288. [3] Wilson, p. 297. [4] Musil, p. 227. [5] Read, p. 64. [6] Schrader, II[3], 227; Feist, pp. 266 ff. [7] De la Vega, I, 199. [8] Johnstone, p. 266. [9] Lane's Dictionary, s. v.

ago'. *Sampae* is the rice-year of six months, but *santa'oe* has practically the same meaning, since the rice is the most important cultivated plant. In general, however, the word is seldom used as a time-indication, but the years are reckoned by well-known events (on this see below, pp. 99 ff.); nevertheless expressions like the following are heard: — *santa'oe owi*, 'when last year's rice-crops still stood on the field', *roeanta'oe owe*, 'two harvests ago' [1]. In the South Sea Islands the bread-fruit is the most important article of food: the people, as we have seen, know a time of abundance of food and a time of scarcity. We are told: — The Malay word for 'year' is *taun* or *tahun*. In all Polynesian dialects the primary sense of *tau* is 'a season', 'a period of time'. In the Samoan group *tau* or *tausanga*, besides the primary sense of season, has the definite meaning of 'a period of six months', and conventionally that of 'a year', as on the island of Tonga. Here the word has the further sense of 'the produce of a year', and derivatively 'a year'. In the Society group it simply means 'season'. In the Hawaiian group, when not applied to the summer season, the word keeps its original sense of 'an indefinite period of time', 'a life-time, an age', and is never applied to the year: its duration may be more or less than a year, according to circumstances [2]. So far our authority. It seems however to be questionable whether the original sense is not the concrete 'produce of the seasons', rather than the abstract 'period of time'. It is significant that on the Society Islands the bread-fruit season is called *te tau*, and the names of the other two seasons, *te tau miti rahi* and *te tau poai*, are formed by adding to this name [3]

Of great significance are the accurate reports for the Melanesians. They have no conception of the year as a definite period of time. The word *tau* (a Polynesian loan-word), or *niulu*, which corresponds most nearly to 'year', signifies a season, and so (now) the space of time between recurring seasons. Thus the yam has its *tau* of five moons, from the planting — when the erythrina is in flower — until the harvest, after the palolo has come and gone. The bread-fruit has its

[1] Adriani and Kruijt, II, 263, ff. [2] Fornander, I, 124; cp. 119. [3] Ellis, *Pol. Res.*[2], I, 87.

tau during the winter months: bananas and cocoa-nuts have no *tau*, since they always bear fruit. The notion of the year as the time from yam to yam, from palolo to palolo, has been readily received, but it is very doubtful if such a conception is anywhere purely native [1]. The Melanesians are only interested in the concrete phenomena of the year, and not in time-reckoning as such, and therefore do not in practice combine the period from yam-planting to harvest with that from harvest to planting to form a year. When it is pointed out, however, it is quite clear to them that this is a single period of the variation of the seasons. The Polynesians have themselves noted this fact, and accordingly the sense of the word *tau* has been extended from 'season' to 'year'.

Whether the conception of the year was known in the Indo-European period is not certain: it is however significant that all the words for 'year' of which the etymology is fairly certain either refer to the produce of the year — as ὥρα and its cognates, and also the word 'year' itself, Old Scand. *ár* — or else come from the *pars pro toto* counting of the year. Thus the Slavonic *leto* means 'summer' and 'year'. Sanskrit *çarad* means 'autumn': that the corresponding Avestic *sared* means 'year' is explained by the fact that the years were reckoned in autumns. The Greek ἐνιαυτός is unexplained, but in Homer, in the law of Gortyn, and in the inscription of the Labyades it has also the little observed sense of 'anniversary' [2], which may be the original sense. Further evidence of the lack of an acquaintance with the conception of the year is afforded by the fact that the Germanic peoples render it by periphrases like 'winter and summer', etc. [3].

The *pars pro toto* counting of the year from shorter or longer seasons does not however extend beyond the years immediately following or preceding. It is stated of the tribes living at the southern end of Lake Nyassa that the years are reckoned in 'rains' up to three or four years: everything beyond that is *kale*, 'some time ago' [4]. In the district around Mombasa, in periods not exceeding five years, the date is usually fixed by

[1] Codrington, p. 349. [2] Prellwitz, in *Festschr. für Friedländer*, pp. 382 ff.; Türk, *Hermes, 31*, 1896, pp. 647 ff. [3] See p. 89. [4] Stannus, p. 288.

the number of harvests which have been gathered [1]. In general the primitive peoples reckon only where an immediate practical interest requires them to do so. The Kiwai Papuans have no word for year, but only for the monsoon periods: they cannot as a rule state how many years have elapsed since a certain event, but only whether it took place recently or long ago [2]. The inhabitants of the islands of the Torres Straits never count years [3]. Individuals belonging to tribes at a low stage of civilisation keep no account of their own age. Among the Waporogo no one can say how old he is [4]. The Edo-speaking tribes have a calendar, but an enquiry as to the age of a man or the number of years since a given event will meet with no answer, or a random one [5]. In Dahomey no negro has the slightest idea of his age [6]. The Hottentots have no interest in their own age, but are interested in that of their cattle, which they reckon by the calving and lambing periods [7]. Few of the Chinhwan of Formosa know their age [8]. The Negritos of Zambales have no idea of their age [9]. No Marquesas Islander, no Oceanian in general, can give either his own age or the time of any event [10]; even the Maoris do not know their age, although they know that the man of forty years is older than the man of thirty [11]. The statements here made obviously refer to the absolute age of a man, not to the relative age; for either it is immediately seen or else easily remembered from childhood who is older and who younger. The Babwende, for instance, never know how old they are, but do know quite well who is the oldest [12]. Since the relative age is thus known, the age of the people and the time of events can be determined by reference to the speaker's own relative age or to that of someone else. On the same page as that from which the above quotation for the Marquesas Islands is taken, it is stated that in order to determine the time of any event the people indicate how tall a person was, or how long his beard was, at the time when the event took place. The Indians of Penn-

[1] Johnstone, p. 266. [2] Landtman, communicated by letter. [3] *R. T. Str.*, p. 225. [4] Fabry, p. 224. [5] Thomas, *Edo*, p. 18. [6] Foa, p. 120. [7] Schulze, p. 369. [8] Kisak Tamai, p. 97. [9] Reed, p. 64. [10] Mathias G., pp. 211 ff. [11] Thomson, I, 198. [12] Hammar, p. 156.

sylvania temporarily determined an event by referring to their own age at the time of its occurrence [1].

From these indications of relative ages there arises of itself a familiar chronological expedient usually found at the point where history begins, viz. the reckoning by generations, which is common e. g. among the Polynesians [2] and in the older Greek historians. Among the Masai an elaborate system for classifying ages has exceptionally developed. The circumcision takes place in four-year periods with intervals of three and a half years. The circumcisions are known alternately as 'right-hand' and 'left-hand'. Those who have been circumcised at the same time have a special name, such as 'those who fight openly or by day', 'those who are not driven away', etc.; one 'right-hand' and one 'left-hand' period combine to form a generation. The 'those-who-fight-openly' period is a 'right-hand' period, and those who belong to it were circumcised in 1851—5; the 'those-who-are-not-driven-away' period is a 'left-hand', and its members were circumcised in 1859—63. The two periods or ages together form a generation composed of persons born from 1834—1850. Each age has three divisions, first those known as 'the big ostrich feathers', secondly those called 'the helpers', and thirdly those known as 'our fleet runners' [3]. It is evident that an excellent basis for the determination of relative time is hereby given. With time-reckoning *per se* the system is not concerned.

Common bases for reckoning are afforded by important and striking events which have been impressed upon everyone and are present to all men's minds: through their relation to the age of some person they serve as a guide to the chronology. The Aino, for example, do not count the days, but always refer to events; if it is asked how old anyone is, the answer will be that he was born after the catching of the very big fish, or perhaps in the year when there was so much snow [4]. Here once more we see how concrete time-indications always precede the abstract numerical counting of time. And where numbers are known they are not willingly used, but the year

[1] Below, p. 108. [2] Ellis, *Pol. Res.*[3], I, 86. [3] Hollis, *Masai*, pp. 261 ff. [4] Holland, p. 234.

is referred to as one distinguished by a certain noteworthy event, instead of being regarded as a member of a series. From a year of this kind the natives can only reckon for a few years at most in either direction. Where there are many such noteworthy years the time-relationship is so far recognised that the succession of the events is known, and perhaps in certain cases also forms the basis of calculation.

In the neighbourhood of Mombasa wars, famines, the arrival of white men form epochs of this kind: it is impossible to detect the age of any adult [1]. It is mentioned that the Toradja of the Dutch East Indies sometimes reckon nearly approaching events or events of recent occurrence by the rice-sowing: dates at a more distant past are indicated by mentioning events of most note, such as the death of a great man, an epidemic of small-pox, an important military expedition, a conclusion of peace, the payment of a tax, etc. The people do not reckon their own age, but count that of their children, saying: "When he was born I had my rice-field there, the next year there", and so on [2]. It is amusing and at the same time instructive to note that precisely the same mode of reckoning was found in Scania at the beginning of the last century. It was a very common thing, says a well-known authority on the folk-lore of this district, for a peasant, when asked how old e. g. his little girl was, to give some such answer as: "She must be four years old, for she is the same age as my brown mare, and she was born when our southern field was a grazing meadow" [3].

The Batak of Sumatra think that a small-pox epidemic returns at intervals of from nine to twelve years, and make use of this belief in reckoning time. On questioning a chief, says a traveller, how old his house was, I was told: "It has existed only for two small-pox epidemics", by which he meant that it was somewhat more than 24 years old [4]. In Borneo there have occurred two eclipses of the sun during the last half-century. The first of these served as a fixed date in relation to which other events were dated [5].

[1] Johnstone, *JRAI, 32,* p. 266. [2] Adriani and Kruijt, II, 263 ff. [3] Nicolovius, p. 7. [4] von Brenner, p. 195. [5] Hose and Mc Dougall, II, 214.

The Eskimos of Greenland knew up to about the twentieth year how many winters a person had lived, but beyond that they could not go. Sometimes however they used as epochs from which to calculate *pellesingvoak,* 'the little priest', i. e. the arrival of Egede in the country, or the arrival or departure of other well-known Europeans, or the founding of Godthaab and other colonies; they would say that this or that person was born at the coming or departure of such and such a person, or when eggs were collected, seals caught, etc. [1].

The Caffres rarely give the proper length of past or future periods of time, and when they do so the period is never of more than a few months' duration. Otherwise it is their custom to determine the date at which this or that event took place by reference to a contemporaneous event of greater importance [2].

The Lapps of Västerbotten reckon their age by the reindeer, e. g. when this or that *aldo* (= female with calf) was born. Formerly they never went farther back in counting than the previous year. When they had to give the date of an important event they referred to the time at which some specially fine female reindeer was born [3].

The Hottentots, as has been said, have no interest in their own age, but keep in mind that of their cattle from the calving and lambing periods. When they wish to date back somewhat farther, well-known events such as the outbreak of cattle-plague, hostilities with neighbouring tribes or with the whites, immigrations, etc. furnish them with satisfactory general indications from which, coupling them in particular cases with the birth of their children or the stature of these at the time, they can arrive at a date [4].

Where the political development has advanced so far that a stable monarchy exists, the succession of rulers offers an excellent means of chronological orientation, and within every reign certain years can be distinguished by special events. But this brings us to the beginning of history, and I desist from following the subject further. One example only: — The Baganda

[1] Cranz, I, 293; Dalsager, p. 55; Egede, p. 132. [2] Alberti, p. 68. [3] Drake, p. 279. [4] Schulze, p. 369.

reckon by the reigns of the kings and by certain wars in one particular reign. They say 'It was in the reign of such a king', or 'I was still in arms when such and such a war was fought in so and so's reign' [1].

Where no reigns furnish a system of chronological reckoning, the concrete references may be systematised until each year is named and distinguished by a definite event. This was the practice of the Arabians before Mohammed. Mohammed is said to have been born in the year of the elephant, or, according to other sources, some years after the year in which the viceroy of Yemen marched against Mecca with an army in which there were elephants [2]. Another year is called the year of treason or outrage, because certain garments which a Himjarite king had sent that year to Mecca were stolen, whence arose a conflict at the feast of pilgrims, in which the young Mohammed is said to have taken part [3].

The Wagogo count the years by important events, e. g. 'the year when the cattle died', or 'two years after the building of Boma (Kilimatinde Station)' [4]. The Masai do not count the years, but rather denote them by referring to the most important events that took place in them, e. g. a murrain, a drought, the death of the chief, an expedition particularly rich in booty, etc. [5]. A fully developed calendar of this nature is possessed by the Herero, and has been published from the year 1820 [6]. I give a few years as examples: — 1820, *ojo* (= year of the) *tjekeue:* from the name of the Matabele chief who in 1820 came to Okahandja with a white peace-ox and made peace with Katjamuaha. 1842, *ojohange,* 'year of peace', the Nama and Herero made peace. 1843, *ojomane,* 'year of the stones': the Herero as the slaves of Jonker Africander had to build for him a stone wall; or *ojovihende,* 'year of the stakes': the Herero had to build a palisade around Jonker's dockyard. 1844, 1845, *ojomukugu* or *ojombondi,* 'year of vomiting, of nausea': the Nama had poisoned Katjamuaha, and the latter vomited and purged. And so on up to 1902 inclusive. There are lacking

[1] Roscoe, *JRAI, 32,* p. 72; cp. id., *Baganda,* p. 37. [2] Sprenger, pp. 137 ff. [3] Ginzel, I, 251. [4] Claus, p. 39. [5] Merker, p. 156. [6] Irle, pp. 222 ff.

only the years 1854, 1855, and, significantly, 1891, 1895, 1899, and 1900, towards the end: the reckoning fails under growing European influence. Several years have two descriptions, e. g. 1844 and 1845 (see above); these and 1887—8 are run together, the latter as the 'year of the red murrain among the cows'.

The same mode of reckoning appears, strongly developed and fixed by the aid of picture-writing, among the Indians of N. America. Heckewelder says of the Indians of Pennsylvania: — "They reckon larger intervals of time by some noteworthy event, e. g. a very severe winter, a very deep snow-fall, an unusual inundation, a general war, the building of a new town by the whites, etc. Thus I have heard more than fifty years ago: — 'When their brother Miqaon talked to their fathers they were so old or so tall, they could catch butterflies or hit a bird with an arrow'. Of others I have heard that they were born in the hard winter (1739—40), or could then do this or that, or already had grey hair. When they could not refer directly to any such distinguishing epochs they would say: 'So many winters after that'" [1]. This method of reckoning seems to have existed among the Pawnee at an initial stage. Sometimes they referred to a year that had been marked by some important event, e. g. a failure of crops, unusual sickness, a disastrous hunt: this was referred to as a year by itself, but after only a few years' remove this mark became indistinct and faded away [2]. Among the Dakota and the Kiowa detailed descriptions were given in picture-writings, which are well-known and have been published, for the Dakota by Mallery and for the Kiowa by Mooney. They are painted on buffalo hide, later also on paper, and represent in painting the history of the tribe. They were executed by a specially gifted Indian and were handed down from father to son. When worn out and obliterated by use they were renewed. In winter they were often produced before the fire, and the events recounted. Everyone knew them, however, so that anybody could shew when he was born or when his father died, and some also knew the meaning of the pictures. Four copies belonging to

[1] Heckewelder, pp. 525 ff. [2] Dunbar, p. 1.

the Dakota are known, which go back to 1800, 1786, 1775, and the mythical period, respectively. Every year is denoted by a picture, without distinction between winter and summer. Some of the terms used are: — 1794—5, the 'Long-Hair-killed' winter; 1817—8, the 'Chozé-built-a-house-of-dead-logs' winter; 1818—9, the 'small-pox-used-them-up-again' winter; 1821—2, 'the star (meteor)-passed-by-with-a-loud-noise' winter; 1825—6, the 'many-Yanktonais-drowned' winter (through an inundation); 1833—4, the 'storm-of-stars' winter (so called from the abundance of shooting-stars), etc. Four Kiowa calendars are known, one of which is arranged in months, of which it gives 37; two of the others refer to the years 1833—93, one to the years 1864—93. In the first each month is indicated by the crescent of the moon, and above is the picture characteristic of the month. The Kiowa annual calendars are clearer than the Dakota in that they indicate winter by a thick black stroke signifying that the vegetation has died, and summer by the medicine lodge with its figures, which form the central feature of the religious ceremonies of the summer. Above and by the side of these signs are the pictures, giving the principal events of the seasons, so that the reckoning of the year becomes the history of the tribe. The Indians however were also acquainted with simpler modes of reckoning. Among the Nahyssan of S. Carolina time was measured and a rude chronology arranged by means of strings of leather with knots of various colours, like the Peruvian *quipos* [1]. The Dakota use a circle as the symbol of time, a smaller one for a year and a larger one for a longer period: the circles are arranged in rows, thus: ō ō ō or o-o-o [2]. The Pima of Arizona make use of a tally. The year-mark is a deep notch across the stick. The records of early years are memorised, and there are a few minor notches to aid in recalling them. The year-notches are alike, yet when a narrator was asked to go back and repeat the story for a certain year he never made a mistake. Taking the stick in his hand, he would rake his thumb-nail across the year-notch and begin: — 'This notch means etc.' [3].

The development is clear. Often an important event has

[1] Mooney, *Siouan Tribes*, p. 32. [2] Mallery, *4*, p. 88. [3] Russel, p. 36.

been impressed upon the memory and now serves as a landmark from which the few years that it is possible to count are reckoned. Such events multiply, and when their succession is known, a longer period can be mastered. Finally the process is systematised, so that every year has its event (necessarily even if it be an unimportant one), and is named from that: hence the reckoning of the years becomes also the history of the people. This kind of time-reckoning is really used by every one of us. Whoever looks back over his past life sees chiefly the more important events, not the dates of the years, and to these he joins the more peripheral events and so finds his way in the labyrinth of memory. But we mark the events by the dates, and thereby obtain an estimation of the course of time, which is the last acquisition of the human mind in this domain. The mode of reckoning in question penetrates deeply among the culture peoples.

The same method of distinguishing the years from one another was employed in ancient Babylonia, in the days of the Sumerian kingdom of Ur in the second half of the third millenium B. C., and also later under the first dynasty in Babylon, and was only replaced by the reckoning according to the years of the king's reign under the dominion of the Kassites [1]. For our historical knowledge of the events these so-called 'year-formulae' are of extreme importance. They vary in each case according to the towns, and shew that these in some respects maintained an independent position. The adoption of the year-formulae of the main locality implies the complete subjugation of the town [2]. No trace of an era or any reckoning by the years of the reign is to be found. Only the king's accession to the throne is utilised for distinguishing the years, the first complete year of his reign (not the year of accession, therefore,) being described as the year of King X. As marks of the other years the most important national events in the domain of the religious cult and of politics are almost universally employed. Only exceptionally is the year named after some violent natural catastrophe. Rather, it is a striking fact

[1] King, p. 215. [2] Cp. King, pp. 95, 130, 143, 144.

that in none of the 66 year-formulae hitherto discovered is there any mention of an eclipse of the sun, or a comet or meteor. If no important event has occurred, the year is described as the one following such and such a year, e. g. the year 49 of king Dungi is called 'the year in which the temple of X. was built'; year 50 = 'the year following that in which the temple of X. was built'; year 51 = 'the year following that in which the temple of X. was built, the year after this'. We see the clumsy method used in order to avoid counting, instead of simply saying 'the second year after etc.': so firmly is the concrete description adhered to. These year-formulae were however used for the dating of documents, and not simply, as among the primitive peoples with whom we have hitherto been concerned, for the retaining of past events in the memory. Hence arises the difficulty that often an event of such importance that the year can be named after it does not occur until well on into the year, that is, the event from which the year is named does not take place until a greater or smaller part of the year has already passed by. Until the event takes place indications of the kind already mentioned, having reference to the preceding year, are employed, e. g. the year 17 of Dungi = 'the year after that in which the ship of Belit (was launched)'; when a noteworthy event happens it gives its name to the year: thus the same year is 'the year in which the god Nannar was brought from Kar-zi-da into his temple'. Hence arise twofold descriptions, and they are indeed necessary in this kind of designation when events of the current year are to be dated by the year. An example containing a political event is the year 36 of Dungi = 'the year after that in which Simuru was destroyed', or 'the year in which Simuru was destroyed for the second time'. It is characteristic to count the destructions of a town but not the years [1]. During the reign of Rimsin of Larsa, a contemporary of Hammurabi, the years begin to be run together into an era: there are many datings from the capture of Isin, up to thirty years after that event, [2]

[1] Kugler, *Sternd.* II: 1, pp. 153 ff.; Ed. Meyer, *Gesch.*, I: 2 [2], 331, together with the bibliography there given. [2] Thureau-Dangin, *Journal asiatique, 14,* 1909, p. 337.

and so under the second king of the first Babylonian dynasty five years were reckoned after the taking of Kazallu [1]. So also under the first dynasty of Babylon the years were described by occurrences, by events in the religious and political life, especially religious acts and buildings of the kings, by wars, and lastly by natural catastrophes, especially inundations of the country [2]. Dates given by events of a previous year are also found. At that period however the year-formula seems to have been given at the New Year's Day and therefore to have been determined beforehand: when important historical events occurred, the year was given a new name from these [3].

In the older period of Egyptian history each year of the king's reign is described by an official name borrowed from the festivals — e. g. those of the king's accession, of the worship of Horus, of the sowing, of the birth of Anubis — from buildings, wars, and the censuses for purposes of taxation. Gradually the simple counting of the years of the reign appears alongside of these names, and from the end of the old empire completely supplants the former method even in official dates. The years however are not calendar years, but begin with the day of the king's accession: they therefore offer the disadvantage of running from different dates according to this. At certain periods however the reigns, as in Babylon, were counted only from the first New Year's Day. Of an era there is only a single example [4]. The Egyptians also began with the concrete descriptions, but passed over, at least within the separate reigns, to the counting of years which is so much more suitable for a survey of the course of time. The Assyrian designation of the year after eponyms, *limmu*, the Greek after archons, ephors, and other eponymous officials, the Roman after consuls etc. are no different. For a people with a fully developed political life and annually changing supreme officials the latter naturally offer a means of distinguishing the years; the life was too regular and too well-established for events of such a decisive nature that they could impress themselves upon the

[1] King, pp. 146, 95. [2] Kugler, *Sternd.*, II, 236 ff; King *passim*. [3] King, p. 190. [4] Ed. Meyer, *Gesch.*, I, 2 [2], 31 and 148, *Chronol.* pp. 185 ff., and elsewhere.

memory of everyone and become available for time-reckoning to be able to happen to the whole people in smaller intervals of time. Here however the system shews a weak point. It is very difficult to keep an arbitrary series of many names in its right order without confusing the names, and only very few persons can do it. The system therefore did not provide that survey over the whole course of time which the awakening historical sense rendered more and more necessary. So men were led to the only practical method, that of simply counting the years and marking them by figures, by which means everyone without more ado became quite clear as to the dates of earlier or later events, whether these were expressed in olympiads, in *ab urbe condita* etc., or in the countless local eras of antiquity. It was long before it was seen that the starting-point is a matter of indifference, and that the only essential is that all should use the same starting-point. In this respect the old reckoning in epochs long continued to influence the minds of men.

CHAPTER IV.

THE STARS.

The time-indications from the phases of the climate and of Nature are only approximate: they themselves, like the concrete phenomena to which they refer, are subject to fluctuation. Even in the tropics, where the regularity of the climatic changes is greater than in our latitudes, the beginning of the rains, the dry season, or monsoons may be to some extent advanced or retarded. In the temperate zones the fluctuations are very perceptible. In the year in which I write this (1916) the corn harvest has been delayed by nearly a month, not only on account of bad weather in harvest-time but also owing to the unusually low temperature of the past summer. Even the townsfolk notice that the days are shorter and the weather is colder than is usual at the time of harvest. Further, incidents of plant and animal life — e. g. the blossoming of certain trees and plants, the arrival of the migratory birds — vary somewhat in different years. In general primitive man takes no notice of these variations: the Banyankole, for instance, are indifferent as to whether the year is one or even three weeks longer or shorter, i. e. whether the rainy season opens so much earlier or later [1]. The days are not counted exactly, but the people are content with the concrete phenomenon. More accurate points of reference are however especially desirable for an agricultural people, since, although the right time for sowing can be discerned from the phenomena and general conditions of the climate, yet a more exact determination of time may be extremely useful. The possibility of such a determination exists — and that at a far more primitive stage than that of the agri-

[1] See above, pp. 91 ff.

cultural peoples — in the observation of the stars, and especially in the observation of the so-called 'apparent' or, more properly, visible risings and settings of the fixed stars, the importance of which has already been explained (pp. 5 ff.) The observation of the morning rising and the evening setting is extraordinarily wide-spread, but other positions of the stars, e. g. at a certain distance from the horizon, are also sometimes observed [1]. The Kiwai Papuans also compute the time of invisibility of a star. When a certain star has sunk below the western horizon they wait for some nights during which the star is 'inside'; then it has 'made a leap', and shews itself in the east in the morning before sunrise [2].

Any reader of the classics will be familiar with the risings and settings of the stars: Virgil, for example, mentions them often. With him however they are pre-eminently a traditional ornament of poetic style: the richest sources are the peasants' rules of Hesiod, in which the stars are mentioned as time-indications along with phenomena of plant and animal life, and appear just as frequently as the latter, often in combination with them. But Homer not only knows several stars but is also acquainted with the risings and settings. A much-quoted passage in the Iliad runs: —

"Him first king Priam saw with his old eyes,
As o'er the plain he lightened, dazzling bright,
Like to the star that doth in autumn rise,
Whose radiant beams, pre-eminent to sight,
Shine with their fellow stars at noon of night:
Orion's Dog we mortals call its name:
Sign is it of much ill, thought clear its light,
And mighty fever brings to man's poor frame:
So, as he ran, the brass upon his breast did flame" [3].

The lines refer to the morning rising of Sirius at the beginning of the fruit-harvest, which about 800 B. C. took place on the 28th of July (Julian). A modern reader, thinking only

[1] See pp. 129. [2] Landtman, communicated by letter. [3] Il. XXII, 25, ff. translated by P. S. Worsley.

of the splendour of the star as it shines in the sky at night, entirely fails to understand the darker and more fateful side of the simile. Only when it is realised that the time of the morning rising of Sirius is the time of the greatest heat and sickness, a period believed to be induced by the rising of this star at the beginning of the fruit-harvest, is the right idea obtained. Like Sirius appearing in the sky in the morning twilight of later summer, Achilles stands out upon the battle-field, eclipsing all others and bringing destruction to the Trojans [1]. A difficulty has been found in the passage in that Sirius at his rising is only just visible and therefore does not shine in his brightest splendour. But Sirius is for the poet the typical brightest fixed star, just as he speaks of the heavens as 'starry' even when the sun is ascending in them [2]. On every day of the *opōre* Sirius rises higher and shines more brightly — one must not think only of the actual first rising, the first day of the star's appearance. Hence the star becomes the symbol of the *opōre*, *ὀπωρινὸς ἀστήρ* [3]. Since it is a star of evil omen it is also called 'the disastrous-shining star' [4]. A star-setting is implied in the words 'the late-setting Arcturus' [5]. The 'late' refers to the fact that the circle which Arcturus describes in the heavens is great, since he stands so far north. Here belongs also the observation that the Great Bear alone of the (greater) stars does not dip down into the ocean [6]. The stars further serve as a guide to navigation [7]: —

"And treacherous sleep ne'er fell on the eyes that were watchful still,
For he kept the Pleiads in front, and the Herdman, who slowly doth gain

[1] Cp. my article in *Arch. f. Religionswiss., 14*, 1911, p. 429. [2] Od. XI, 17; XII, 380; see above, p. 35. [3] *ἀστέρ᾽ ὀπωρινῷ ἐναλίγκιον. ὅστε μάλιστα λαμπρὸν παμφαίνῃσι λελουμένος Ὠκεανοῖο* — Il. V, 5: 'bathed in the Ocean', since Sirius at his rising emerges like the sun from the ocean. [4] *οὔλιος ἀστὴρ παμφαίνων* — Il. XI, 62. [5] *ὀψὲ δυόντα Βοώτην* — Od. V, 272. [6] Il. XVIII, 489; Od. V, 275. [7] *οὐδέ οἱ ὕπνος ἐπὶ βλεφάροισιν ἔπιπτεν Πληιάδας τ᾽ ἐσορῶντι καὶ ὀψὲ δύοντα Βοώτην ἄρκτον θ. τ. λ.* — Od. V, 271 ff., translated by A. S. Way.

His rest, and the Bear, — they are wont to call it moreover
the Wain:
Ever turning at bay, doth it glare on Orion's falchion-gleam,
And alone it hath no share in the baths of the Ocean-stream: —
For Calypso, the Goddess divine, had bidden him still to keep
Over his left that sign as he fared on the face of the deep".

The Pleiades, the Hyades, and Orion are also mentioned, but not in any special connexion with the indication of time [1]. The morning-star helps to determine time on a night journey [2].

Hesiod says that at the time when the thistle blooms and the cricket chirps Sirius burns heads and knees [3], and that when the late autumn rains come men feel relieved, since the star Sirius is not passing over their heads for so long a time but uses the night more [4]. Commentators of classical times have indeed here taken Sirius to mean the sun. But wrongly; for Sirius, whose rising introduces the time of greatest heat, is for the Greeks the cause of the heat, just as the Pleiades are for the Australians, and as all stars are held to be the causes of those climatic changes which are connected with any of their risings or settings [5]; when Sirius rises earlier, i. e. remains in the heavens for some hours during the night-time, the heat declines. The other passages are: — vv. 564 ff., evening rising of Arcturus (60 days after the winter solstice, Feb. 24, Julian), followed by the coming of the swallow, messenger of spring, before this time the vines should be pruned; vv. 597 ff., the winnowing of the harvested corn at the morning rising of Orion (July 9); vv. 609 ff., when Orion and Sirius are in the middle of the heavens and the dawn sees Arcturus (morning rising Sept. 18), it is the time of the vine-harvest; vv. 615 ff., at the (morning) setting of the Pleiades (Nov. 3), of the Hyades, and of Orion (Nov. 15) it is time to think about sowing; vv. 619 ff., when the Pleiades, fleeing from Orion, fall into the sea, storms rage, and the ship should be drawn up on land. Alcaeus says: — "Drink wine, for the star (viz. Sirius) revolves" [6].

[1] Il. XVIII, 486. [2] Od. XIII, 93. [3] *Op.*, vv. 528 ff. [4] vv. 414 ff. [5] Pfeiffer, pp. 1 ff. [6] Alcaeus, fr. 28a Matth.: — *τέγγε πλεύμονα ϝοίνῳ· τὸ γὰρ ἄστρον περιτέλλεται.* Cp. Theognis vv. 1039 f.

The time-indications from the stars are therefore much older in Greece than the lunisolar calendar, and always existed alongside of the latter — which was of a religious and civil character — as the calendar of peasants and seamen, who must hold to the natural year and its seasons. The watchman who speaks the prologue of the *Agamemnon* of Aeschylus says: —

"... On elbow bent, watching, as 'twere a dog,
I mark the stars in nightly conclave meet.
And those bright constellations, without peer,
Lords paramount in heaven, that winter bring
And summer in their train for mortal men,
Right well I know them as they come and go" [1].

The discovery of star-observation and of its use in time-reckoning and navigation is ascribed to the heroes Prometheus and Palamedes. The latter is regarded by the tragic poets as the founder of all the elements of intellectual culture, and so also of the science of the stars [2]. And Prometheus, who glories in having brought to men every advance in civilisation, includes therein the knowledge of the risings and settings of the stars: —

"Of winter's coming no sure sign had they,
Nor of the advent of the flowery spring,
Of fruitful summer none: so fared through each,
And took no thought, till that the hidden lore
Of rising stars and setting I unveiled" [3].

Later, the phases of the stars have become so familiar to everyone that Sophocles can say, 'a time of six months from spring to Arcturus', i. e. the morning rising of Arcturus on Sept. 18 [4].

Whether the Romans made use of time-indications from the stars before they borrowed them from the Greeks is uncertain; in any case they had their own names for some constellations: — *vesperugo, iubar = lucifer,* the evening star, *septentriones* or *iugulae,* the Great Bear, *vergiliae,* the Pleiades.

[1] Aeschylus, *Agam.,* vv. 4 ff., translated by E. Thring. [2] Schol. Aesch. *Prom.,* 457; Soph. *Palam.,* fr. 399 N[2]. [3] Aesch., *Prom.,* 453 ff., translated by R. Whitelaw. [4] Soph., *Oed. Rex,* v. 113, — ἐξ ἥρος εἰς ἀρκτοῦρον ἑκμήνους χρόνους.

Suculae, the Hyades, and *canicula,* the Dog-star, are translations of the corresponding Greek names [1].

At a later period the risings and settings of the stars, together with the climatic phenomena accompanying them or believed to accompany them, were brought into a calendar, which was then arranged according to the signs of the zodiac, or later according to the months of the Julian or Egyptian solar year. The Greek lunisolar year was unsuitable for the purpose, since it varied in reference to the sun and the stars. How both were adjusted to practical needs is shewn by the remains of two stone calendars found at Milet. On the stone are inscribed the risings and settings of the stars, arranged according to the signs of the zodiac: by the side of these are holes into which little tablets containing the days of the lunisolar calendar could be fitted, these tablets being arranged according to the relation of every lunisolar year to the solar one [2].

The Arabians also carefully observed the stars, and many of their proverbs couple the risings of the stars with natural events [3]. Since these constellations are the so-called lunar stations their use here is not primitive, but must have been added on to a primitive usage. The Pleiades were observed throughout their course, and about most of the positions which they take up mnemonic verses were made. Mohammed swears by the setting Pleiades in the 53rd chapter of the Koran.

We return once more to the primitive peoples. It may be well first to show by a few examples how far they were acquainted with the stars and saw in them images of terrestrial things. The Chukchee give names to the most important constellations. Among divinities are reckoned 'the Motionless Star' or 'the Nail-star' or 'the Pole-stuck Star', the Pole-star, 'the Front Head and the Rear Head', Arcturus and Vega, and *pchittin,* a part of Aquilo. Orion is an archer with a crooked back, who has shot a copper arrow, Aldebaran, against a 'group of women', the Pleiades. His wife is Leo, 'the Standing Woman'. Capella is a reindeer-buck which is tied behind the sledge of a man driving with two reindeer; a fox approaches from the side. Six of the stars of the Great Bear are men throwing

[1] Gundel, pp. 99 ff. [2] Rehm. [3] Sprenger, pp. 162 ff.

with slings, the seventh is a fox gnawing at a pair of antlers. The Twins are two elks running from two hunters who are driving two reindeer-teams. Corona is the paw of the Polar Bear. Delphinus is a seal, Cassiopeia represents five reindeer-bucks standing in the middle of a river [1].

The Eskimos of Greenland have a good knowledge of the stars. The Great Bear is a reindeer, or the little stool on which they fasten their ropes and harpoons, Aldebaran is the eye of the bull, the twins are the breast-bone of the heavens, the belt of Orion is composed of three 'scattered ones' — Greenlanders who were taken up into the sky and could not find their way back — Sirius has a man's name, the Pleiades are to be regarded as baying hounds with a bear among them, Cygnus as three kayaks which have been out seal-hunting. Venus is the follower or man-at-arms of the sun. When one planet crosses the path of another it is a wife and a concubine who have one another by the hair, or else it is a visit of two stars [2]. By the Ammasalik names are given to Vega ('the Foot of the Lamp'), which, like the moon, is the brother of the sun, to the Great Bear, the Pleiades ('the Barkers'), the belt of Orion, and Aldebaran; Jupiter is the mother of the sun [3]. Among the Konyag of the island of Kodiak, off the south coast of Alaska, two months are named after the risings of the Pleiades and Orion respectively [4]. Of the Thlinkit it is said that few constellations or stars appear to have been named by them: those to which names are given are 'the Great Dipper', which by night used to serve as a guide, the Pleiades *(sculpin),* 'Three-men-in-a-line' (probably the belt of Orion), Venus as the morning star ('Morning-round-thing'), and Jupiter (?) as the evening star ('Marten-month' or 'Marten-moon'). If the morning star comes up above a mountain south-east of Sitka, it means bad weather, if well over in the east, good weather [5]. Otherwise the North American Indians have paid less attention to the stars: but it is exaggerated to say [6] that the sum-total of their astronomical knowledge was the ability to point to the Pole-star

[1] Bogoras, II, 307 ff. [2] Egede, pp. 131 ff. [3] Holm, *10,* 142, and *39,* 106 and 85. [4] Schiefner, p. 204. [5] Swanton, p. 427. [6] Carver, p. 253.

from which they took their way when they travelled at night, which however they did unwillingly. The tribes of Pennsylvania had names for a few stars, and observed their motions: the Pole-star shewed them by night the direction they must take in the morning [1]. The Omaha called the Pole-star 'the Not-moving-star', the Pleiades were called by an old name, 'the Deer's Head'; this name, which had a religious significance, was not commonly used, the popular name being 'Little-duck's-foot'. The Great Bear was 'the Litter', Venus 'Big-Star' [2]. For the Klamath are mentioned only the three stars in the belt of Orion [3], for the Biloxi and Ofo 'Stars-all-heads' (?) (three large stars near the Pleiades), 'Stars-in-circle' (the Pleiades), and 'Big Star', the morning star [4]. The Luiseño of southern California name the most important stars. The associated stars form much larger groups than those common among us. The stars were chiefs among the first people. Those most frequently mentioned are Antares and Altair. Arcturus is the right hand of Antares, it rises before the latter and announces his coming, the other stars around Antares are his suite. Other chiefs are Spica, Fomalhaut, and the Pole-star. Orion and the Pleiades are always mentioned together; the latter were seven sisters, pursued by Aldebaran. The Diegueño constellations are altogether different from the Luiseño, and are based upon totally different ideas: it has not been possible however to obtain an accurate account of them [5]. Of the natives of Guadeloupe it was reported at their discovery: — In other places they merely reckon the day by the sun and the night by the moon; these women however reckoned by other stars, and said that when the Great Bear rose or a certain star stood in the north it was time to do this or that [6].

The Indians of South America have observed the stars in much greater detail. The descriptions of von den Steinen are well known, in particular for the Bakairi of Central Brazil. Orion is a large frame on which manioc is dried, the larger stars are the tops of posts, Sirius is the end of a great cross-beam supporting the frame from the side. The Pleiades are a

[1] Heckewelder, p. 527. [2] Fletcher and La Flesche, p. 110. [3] Gatschett, p. 666. [4] Dorsey and Swanton, p. 203. [5] Du Bois, pp. 162 ff. [6] Columbus, p. 635.

heap of grains of meal that have fallen out at the side: a larger mass, 'the father of the heap', is Aldebaran. Capella is a little capsule such as the Bakairi wear in their ears, two other stars of Auriga are the ear-rings of the Kayabi, the feathers of which are stuck backwards. One star, probably Procyon, is an ear-piercer, or more properly the hole bored in the ear. Castor and Pollux are the holes of a great flute. Canopus has no name. The Southern Cross is a bird-snare on a twig, and the two large stars of the Centaur represent two canes belonging to it. In the snare a *mutum cavallo (crax)* was taken, and this could be seen in a dark patch of the Milky Way close beside. A Sokko heron with a little basket full of fish corresponds approximately to the stars of Pisces and Argo. The Scorpion is a drag-net for children, the Milky Way is a huge drum-stick, and the holes in it (the dark spots) are observed and explained by stories. The Paressi have a name for the Southern Cross, above which they see an ostrich whose figure is to be recognised in a dark spot of the Milky Way: other animals are also found in the sky. To the Bororo the Southern Cross represents the toes of a great ostrich, the Centaur a leg belonging to them, Orion is a Jabuti turtle and in the parts verging on to Sirius a cayman, the Pleiades are the bunches of blossom on the angico tree. The name of Venus was not translatable [1]. The Karaya of Central Brazil knew many constellations, and drew some of them in our informant's sketch-book. The Southern Cross, for example, is a ray (the fish), the two stars of the Centaur above it represent an ostrich, upon which a jaguar, Scorpio, is leaping [2]. Of the natives of Brazil in general it is stated that there is hardly a single important constellation which does not explain to them some event, or represent some idea in connexion with things that happen upon the earth, though they certainly have no heroes to set in them. Myths of Orion, of the Pleiades, and of Canopus were related [3]. E. Nordenskiöld has repeatedly visited the border districts between the Argentine, Bolivia, and Brazil. Of the Chané and Chiriguano Indians he says that

[1] von den Steinen, *Zentralbras.*, pp. 359 ff., 436, 513. [2] Krause, p. 340. [3] Teschauer, pp. 734 ff.

they do not give names to many constellations, but they know them very well. The part of the Milky Way lying nearest to the Southern Cross is called the Ostrich Way, the Southern Cross together with a few neighbouring stars is the head of the ostrich, and the two largest stars of the Centaur are its collar. Orion with his sword is called 'Birds-meet-each-other', another constellation is 'the Roe-buck's Horn', still another 'the Tapir'; the Pleiades are the most important constellation, they are called *yehu,* but the natives do not know the meaning of the name. Venus is called *coemilla,* 'morning'. The Guarayu call Orion 'the Black Vulture'; at his side lies a heap of snake's bones (the sword). The Southern Cross with the stars around it is an ostrich, the two large stars of the Centaur are a roe-buck, the Great Bear is a road, a cluster of stars in the south is 'the Eel's Nest'. The Pleiades are called *piangi,* a word of unknown meaning; when, on their return after their period of invisibility, they are surrounded by a circle, it is a good omen: if the circle is missing, all men will die. Venus is called 'the Big Star' [1]. The Karai tribes called α, β Centauri the ostrich's feet, the body is the neighbouring 'coal-pit' (the dark spot of the Milky Way), the Southern Cross is a fresh-water ray, the Pleiades are a flock of parakeets, Orion is the burning roça, the tail of the Scorpion is called *unze.* The Ipurina of Rio Purus call Orion a beetle, the Pleiades a serpent, the Hyades a turtle, the Cross forest-folk [2]. In a Chilean word-list there are words for star, constellation, the Pleiades, Orion, planet, Venus [3].

In Africa the comparatively more civilised negro tribes seem to have paid less attention to the stars than the more primitive tribes of the south. The Ho tribe considers the stars to be the children of the moon: it recognises and names the most important constellations, the morning star ('the Clucking Hen'), and the stool-bearer of the moon, a star always situated in the vicinity of that planet. The Milky Way is composed of stars forming a cord [4]. Of the Ibo-speaking tribes we are told that they seem to be singularly incurious about heavenly

[1] Nordenskiöld, *Indianlif,* p. 273, *Indianer och hvita,* p. 173. [2] Ehrenreich, pp. 44 f., 72. [3] Molina, pp. 319 f. [4] Spieth, p. 557.

bodies and occurrences; however names were got for the following constellations: — The Pleiades ('Hen and Chickens'), the belt of Orion ('Three and Three'), for the Great Bear two names not translated were given, Venus ('the Wise-Man-who-can-talk') [1]. In French Guinea *η ursae* is an ass, and the little star above it is a thief pursued by the six other stars, members of the tribe to which the stolen animal belongs. For other peoples the Great Bear is the star of the camel, Cassiopeia is that of the ass, the Pleiades have the name 'murmur', i. e. a confused thing. Jupiter (?), the companion and guardian of the moon, is held in particular veneration. The marabout in the morning awaits the rising of Venus, and announces by cries, or sometimes by blows on a gong, the hour of prayer. Everyone has his good and bad stars, which the magician takes carefully into account [2]. The intrusion of astrology is not striking, since the people are Mohammedans, while the names of the constellations must be of native origin. The Bakongo call the three stars in Orion's belt 'the Dog', 'the Palm-rat', and 'the Chief Hunter'; Venus is the wife of the moon. The people think that the rain comes from the Pleiades, who are regarded as the 'Caretakers-who-guard-the-rain', and if, at the beginning of the rainy season, this constellation is clearly seen, they expect a good rainy season, i. e. rain for their farms without superabundance [3]. The Bangala call the Pleiades a group of young women; five stars in Lepus, *kole*, are a man with head, hands, and feet; the belt of Orion represents three rowers; five stars in Orion are bundles of thunder and lightning; the evening star also has a name. From the appearance of the Milky Way they draw conclusions as to the lack or abundance of rain; when it is bright and clear there will be much rain [4]. Ten star-names of the Shilluk are given, but only two are translated: the Pleiades are 'the Hen', and 'Three Stars' is Uranus *(sic!)*. Venus and a fore-runner of Venus are known [5]. The Wagogo know the Milky Way, the Pleiades, and the belt of Orion; the western star of the last-named is to them a boar, the middle star is the dog, and the eastern the

[1] Thomas, *Ibo*, p. 127. [2] Arcin, p. 394. [3] Weeks, *Bakongo*, pp. 293 ff. [4] Weeks, *JRAI, 39*, pp. 417 ff. [5] Westermann, p. 104.

hunter [1]. Of the Thonga it is further stated that the stars play a remarkably small part in their ideas. Venus is the best known, the Pleiades is the only constellation with a name; they have no notion whatever of constellations, their mind seems not to have tried to group the stars, or to have seen figures of animals or objects in the sky [2]. In Loango the following constellations are distinguished: — the false Southern Cross ('the Turtle'), the Scorpion ('the Serpent'), the Pleiades ('Ants'), Orion ('the Fish'), his belt ('the Line of the Hunter', who leads a dog), Sirius ('the Rain-star'). The natives are aware that certain stars move; Jupiter is called 'the Great Star', Venus as the evening star is the wife of the moon, as a morning star she is the liar, spy of the moon, or false moon, illusory moon [3].

Far greater knowledge is possessed by the Hottentots, who know the planets accurately. Venus is 'the Fore-runner of the sun', or the star at whose rising men run away (i. e. from illicit intercourse), Mercury 'the Dawn-star', or the star that comes when the udders of the cows (which are milked morning and evening) are filled again: as an evening star he is not observed. Venus as an evening star is recognised to be the same celestial body as the morning star, and is called 'the Evening Fugitive', since it does not remain long in the sky. Jupiter is known, but is sometimes identified with Venus; when however he is seen in 'the middle of the sky' he is called 'the Middle Star'. The six stars of the belt and sword of Orion are grouped together as 'the Zebras': δ, ε, ζ are three fugitive zebras against the middle one of which the hunter ι shoots his arrow ϑ and c. The Pleiades, on account of their thick cluster of stars, are called by a name derived from a verb meaning 'assemble', or are otherwise known as 'the Rime-star'. The Milky Way is called '(glowing) Embers', the Magellanic Clouds 'Embers' in the dual. Of single fixed stars our author heard only Sirius called by a name, 'the Side-star' [4]. The Bushmen divide the stars into night-stars and dawn-stars: of the latter they relate very fine

[1] Claus, p. 39. [2] Junod, *Thonga*, II, 285. [3] *Loango Exp.*, III: 2, pp. 135 ff. [4] Schulze, pp. 367 ff.

and complicated myths, such as that of the connexion between 'the Dawn's Heart' (Jupiter) and a neighbouring star, his daughter (Regulus or *α leonis*). Achernar is 'the Star-digging-stick's-stone', or 'the Digging-stick's-stone of Canopus'; the Pointers to the Southern Cross are three male lions; *α, β, γ crucis* are lionesses; Aldebaran is a male hartebeest, *α* Orion is a female hartebeest, Procyon a male eland, Castor and Pollux his wives, the Magellanic Clouds a steinbok, Orion's sword three male tortoises hung upon a stick, his belt three female tortoises so hung [1].

The Toda of S. India know the Pleiades, Orion's sword ('the Porcupine-star'), the Great Bear, and Sirius, and relate about them myths which are probably borrowed from the neighbouring Badaga [2]. The pagans of the Malay Peninsula know the evening and the morning stars, and the stars of the astrological seasons *(sic!)*, or the Pleiades [3]. In the Indian Archipelago the observation of the Pleiades as a sign of the arrival of the season for sowing is very common. Of the Kayan of Borneo it is stated that though they do not observe the stars or their movements for practical purposes, they are familiar with the principal constellations, and have fanciful names for them and relate mythical stories about the personages they are supposed to represent. The Klementan call Pegasus 'the padi storehouse', the Pleiades are 'a well', the constellation to which Aldebaran belongs is 'a pig's jaw', Orion is a man whose left arm is missing [4].

The natives of Australia have a rich stellar mythology [5]. The evening star has its name and its myths. The Pleiades are women who in the Alcheringa period lived at Intitakula: this is believed by all the tribes whom our authority studied. Orion they regard as an emu, and the stars in general as campfires of natives who live in heaven. As a general rule, however, the natives appear to pay very little attention to the stars in detail, probably because these enter very little into

[1] Bleek, p. 108. [2] Rivers, pp. 593 ff. [3] Skeat and Blagden, II, 724. [4] Hose and Mac Dougall, II, 213 f., 139. [5] Many names of stars are given, e. g. by Ridley and MacPherson, others by Kötz, pp. 30 ff. I give only a few examples; cp. also pp. 131 ff. and 144.

anything which is connected with their daily life, more especially with their food-supply. By the northern Arunta and the Kaitish the Magellanic Clouds are supposed to be full of evil magic, which sometimes comes down to earth and chokes men and women in their sleep [1]. According to another author acquainted with the Arunta the Pleiades are seven maidens who had danced at the circumcision ceremony and then ascended into heaven. Two stars in the neighbourhood of the Magellanic Clouds are called 'the two Gland-poison Men': the Clouds are the smoke of their fires; the dark patch in the Milky Way is an article of adornment *(ugapatjinbi)*, the Southern Cross 'an eagle's foot'. The morning star is also known [2]. The tribes of S. E. Australia give names to many stars and group some of them together in constellations, among which are the sons of Bunjil. The Wiiambo thought that the stars were once great men. The Southern Cross is an emu, Mars an eagle, another star is a crow. The Pleiades, according to the Wotjobaluh, are some women, *corona australis* is 'the Laughing Jackass', a small star in Argo is 'the Shell Parakeet' [3].

A very high stage of development in stellar science and mythology is reached among the Euahlayi tribe of the north-west district of New South Wales; anyone interested in the catasterisms of ancient mythology should read the full account given for this tribe. Venus is called 'the Laughing Star' — the reason for her laughter is a coarse jest —, the Milky Way is an overflow of water. The stars are fires which the spirits of the dead have lit in their journey across the sky, and the dusky haze — i. e. presumably the dark patches without stars, which interest primitive peoples as much as the stars themselves — is the smoke of the fires. A waving dark shadow which you will see along the Milky Way is a crocodile. Two dark spots in Scorpio are devils who try to catch the spirits of the dead; sometimes they come down to earth and make whirlwinds. The Pleiades are seven sisters, ice-maidens; two have been dulled because a man caught them and tried to melt the ice off them: they succeeded in escaping to heaven, but do not

[1] Spencer and Gillen, *Central Australia*, pp. 565 f., *North. Tribes*, pp. 628 ff. [2] Strehlow, I, 19 f., 21 f., 24; II, 9. [3] Howitt, pp. 431 f.

shine so brightly as their sisters. The sword and belt of Orion are boys who on earth loved and followed the Pleiades, but after death were turned into stars. In order to remind people of them the Pleiades drop down some ice in the winter, and it is they who make the winter thunderstorms. Castor and Pollux are two hunters of long ago. Canopus is 'the Mad Star': he went mad on losing his loves. The Magellanic Clouds are 'the Native Companions', mother and daughter, pursued by Wurrawilberoo. 'The Featherless Emu' is a devil of water-holes, who goes every night to his sky-camp, 'the Coal-pit', i. e. the dark spot beside the Southern Cross. Corvus is a kangaroo, the Southern Crown an eagle-hawk, the Cross the first spirit-tree, a huge *yaraon* which was the medium for the translation to the sky of the first man who died on earth. The white cockatoos which used to roost in the branches of this tree followed it and became the Pointers [1].

Ridley has obtained from the former chief of the Gingi tribe a long series of star-names. Especially noteworthy for the observation of the risings is the following. The Northern Crown is called *mullion wollai*, 'the Eagle's Nest', when it stands exactly north on the meridian. Altair rises, and is called *mullion-ga*, 'Eagle-in-action', the eagle springs up to guard his nest. Later Vega rises, and is also called *mullion-ga*. The 'holes' are also well known. The dark spot at the foot of the Cross (the *zuu* tree) is called an emu, the bird sits under the tree [2]. Elsewhere the star at the head of the Cross is an opossum fleeing from a pursuer — the 'hole' between the fore-feet of Centaurus and the Cross [3].

As to the stellar science of the Melanesians we are very variously informed. The tribes of the Torres Straits have a richly developed mythology and observation of the stars [4]. They distinguish the planets from the fixed stars, at least they notice that Venus does not twinkle [5]. The Banks Islanders never travel by night, and consequently do not use the stars in navigation; in consequence of this, says our authority, no de-

[1] Parker, pp. 95 ff. [2] Ridley, p. 274. [3] Brough-Smyth, I. 433, quoted by Kötz, p. 37. [4] See below, pp. 139 ff. [5] *R. T. Str.*, p. 219.

finite information about the names of stars or constellations could be obtained. A native gave a few names, but could not point out the stars which they were said to denote [1]. The Moanu of the Admiralty Islands understand the moon and the stars, but the Matankor know neither stars nor moon [2]. A statement such as this must be received with great reserve, especially when it comes from a native of another tribe. In any case it would constitute an exception, since extremely primitive tribes know the stars quite well, the natives of New Britain and of the Solomon Islands even very well. The Pleiades and *corona borealis* play an important part (cp. below, p. 141). The former are called in Lambutjo *kiasa,* on the Gazelle Peninsula 'the People-at-the-feast', and on Bambatana and Alu the year is reckoned according to them: the Crown is called in Lambutjo 'the Fisher', in Buin 'Taro-leaf-greens', on the Gazelle Peninsula 'the Thornback'. Further star-names are: — for the Hyades in Buin 'Earth-rat', in Lambutjo *kapet,* a large net for deep water, on the Gazelle Peninsula *kakapepe,* a kind of small fish, the star in the middle of the constellation is called 'Hog-fish'. Cygnus is called in Buin 'Hog-bearer', in Lambutjo 'the Three Men'. 'The Dog' or 'Shark' is a large star 'that pursues the Fishes'. Many myths are told of the stars [3]. Another authority remarks that the natives of the Solomon Islands are more concerned about the stars than the eastern Polynesians, perhaps because of their longer sea-voyages. The possibility of influence from the astronomically learned Polynesians must also probably be entertained. The people of Santa Cruz and the Reef Islands excel all others in their practical astronomy. The natives of Banks Island and the northern New Hebrides content themselves with distinguishing only the Pleiades, by which the approach of the yam-harvest is marked, and with calling the planets *masoi* from their roundness, as distinct from *vitu,* 'star'. In Florida the early morning star is called 'the Quartz-pebble-for-setting-off-to-sea': when it rises later, however, it is 'the Shining-stone-of-light'. The Pleiades are 'the Company of Maidens', Orion's belt is 'the War-canoe', the eve-

[1] Rivers, *Mel.,* I, 173. [2] *Ibid.,* II, 352, quoting Parkinson, p. 376, from the statement of a native Moanu. [3] Thurnwald, pp. 340 ff.

ning star 'Listen-for-the-oven', because the daily meal is taken as evening draws on. All stars are called dead men's eyes. At Saa the Southern Cross is a net with four men letting it down to catch palolo, and the Pointers are two men cooking what has been caught — because the palolo appears when one of the Pointers rises above the horizon. The Pleiades are called 'the Tangle', the Southern Triangle is 'Three-men-in-a-canoe', Mars is 'the Red Pig' [1].

The Polynesians are very learned in astronomy, and their bold and wide sea-voyages have helped to make them so, since in these the stars are their principal guide. The Tahitian, Tupaya, who accompanied Cook on his first voyage, could always point out to him the direction in which Tahiti lay [2]. When the Society Islanders put to sea in the evening, as was most commonly the case in their voyages, one constellation, preferably the Pleiades, was chosen as a point to steer by [3]. A detailed report is given for the Marshall Islands: — In the journey from atoll to atoll the course of the boat is commonly directed from a certain passage, island, or promontory to a passage or promontory of the atoll to be reached. Above this spot stands the star that gives the direction. It is the sailor's business to know for how many hours a star can serve him as compass, so that immediately after the apparent turning of the star from east to west he may choose another. Of great interest also is the idea of the connexion between the atmospheric and other phenomena and the stars. Certain periods of bad weather recur every year with tolerable regularity, so that the sailors attribute them to the immediate influence of the stars. When, for instance, at 4 o'clock in the morning — at which time the signs of the weather are observed — the stars stand just above the eastern horizon, they stop up the east, so to speak, and prevent the free passage of the wind. But if the pernicious star in question is at the given time 20° or 30° above the horizon, there is enough space between star and horizon for the wind to be released. This strong wind will last until another influential star arises under the first. This

[1] Codrington, p. 348. [2] Forster, p. 442. [3] Wegener, p. 148.

lower star acts like a wind-chute placed against an open hut. The strength of the wind is therefore reduced. This explains why every storm is followed by a wind favourable for sailing. For example when Spica is 20° above the horizon a violent storm is developed, but this only lasts until Arcturus some time later becomes visible on the eastern horizon. The most important of the stars that bring bad weather are Spica, Arcturus, Antares, the claw of the Scorpion, Altair, Delphinus, β, μ, λ and γ, ξ, π *Pegasi*. With the rising of Cassiopeia the time of calms begins. Jedada (γ, ζ, π *aquilae*) 'disembowels the heavens'. Altair is regarded as a bad fellow. When he rises in the east before dawn it is commonly a time when food supplies have run low, so that quarrels arise: only when he rises higher and the hot season (June—August) brings plenty of food, do reconciliation and goodwill return. Of 'King Jäbro', the Pleiades, long myths are related: when they emerge from the horizon joy prevails, but tears are shed when they vanish again into the west [1]. The knowledge of the stars was often a carefully guarded secret, but through prevailing European influence it has now fallen entirely into decay. In Samoa it is now an exception for a native to know the name of this or that constellation, since an islander engaged in the fishing trade can only indicate and name this or that star if it marks the beginning of some important native occupation [2].

The Polynesian material for star-names is exceedingly abundant, and can here only be represented in outline, so as to give some idea how far astronomy may advance at this stage of civilisation [3]. The Marquesas Islanders know and name a great number of constellations and separate stars, e. g. 'the Little Eyes' (the Pleiades), 'the Rudder' (Orion's belt) [4]. Constellations mentioned as being known to the Society Islanders are: — the Pleiades, Orion's belt, Sirius ('Big Star'), the Magellanic Clouds (the upper and lower 'Haze'), the Milky Way ('the Long-blue-cloud-eating-shark'), Venus, called sometimes 'Day-star' or 'Herald-of-the-morning', and sometimes 'Taurna-who-rises-at-dusk', Mars ('the Red Star'), Jupiter, and Saturn [5].

[1] Erdland, pp. 24 ff. [2] von Bülow, *72*, p. 238. [3] See further Kötz, pp. 43 ff. [4] Mathias G., pp. 209 f. [5] Wegener, p. 148.

The people of Nauru, west of the Gilbert Islands, observe the stars, chiefly the Pleiades, Orion, Sirius, and the morning and evening stars [1]. For the Marshall Islands see above, p. 125. For Tahiti names are given for Venus, Jupiter, Saturn, the Pleiades ('Star-of-the-nest'), Sirius ('Big Star'), and the belt of Orion, and it is further stated that many other stars are known by separate names [2]. The Hawaiians had names for many constellations, and they also knew the five planets [3]. An apparently distinguished native astronomer, named Hoapili, stated that he had heard from others (Europeans ?) that there was one more travelling-star, but he had never observed it, and was acquainted only with the five [4]. The Maoris had names for all the principal stars and for a great number of constellations. The most important of the latter is 'the Canoe of Tamarereti', which consists of the following parts: — the three stars of Orion's belt form the stern, *matariki* (the Pleiades) is the prow, *te toke o te waka* is the mast, the Southern Cross is the anchor, and the two Pointers are the cables. Further, Orion's belt is called 'the Elbow of Maui'; the Scorpion is 'the House-of-Te-Whiu-and-his-slaves'; *Waka mauruiho* and *Waka mauruake* are the husbands of *Hurike* and *Angake,* and their daughters are *Tioreore* and *Tikatakata,* the two Magellanic Clouds, whose husbands are *Taikeha* and *Ninikuru.* By the position of the Magellanic Clouds the natives think they can tell from what quarter the wind will blow. One constellation is called 'the Garment of Maru', which he let fall as he ascended into heaven. Unfortunately the names corresponding to our star-map are not given, and I have omitted many which are not translated [5]. Some stars are mentioned below in the account of the Maori calendar of months [6].

The Micronesians know the stars well; long lists of star-names come from the Carolines. 18 names are given for Ponape, among them names for the Pleiades, the Southern Cross, and the Magellanic Clouds; from Lamotrek come 24, e. g. 'the Leather-jacket-fish' (the Southern Cross), 'the Broom' (Ursa Minor), 'the Virile Member' (Aldebaran), 'the Body-of-the-animal' (Sirius);

[1] Brandeis, p. 78. [2] Forster, p. 442. [3] Fornander, I, 127, note 1. [4] Dibble, p. 107. [5] Taylor, p. 363. [6] Pp. 211 f.

'the Centre-of-the-house' (Arietes). 'the Two Eyes' (Scorpio), 'the Fowling-net' (Corona), 'the Tail-of-the-fish' (Cassiopeia), etc.; from Mortlock 23, e. g. (Ursa Minor) *fusa-makit,* 'the Seven Mice', or it may mean 'the Star-that-changes-its-position' *(sic!),* Leo, 'the Rat', the Southern Cross (perhaps), 'the Shark', Delphinus and Cygnus, 'the Bowl-in-the-midst-of-Sota', Sirius, 'the Animal', Orion and Aldebaran, 'The Branch-of-the-tree', not identified, 'the Fish-net'; from Yap 25, unidentified [1]. The Fijians on the other hand knew little about the stars. They had no names even for the most important constellations. The evening and morning stars were known, under the names of 'Marking-day' and 'Marking-night', but the natives did not distinguish between the planets and the fixed stars. Their ignorance is ascribed to the fact that they never undertake voyages beyond the limits of their groups, and are bad navigators in the technical sense, although good sailors [2].

Stellar science and mythology are therefore wide-spread among the primitive and extremely primitive peoples, and attain a considerable development among certain barbaric peoples. Although this must be conceded, some people are apt to think that the determination of time from the stars belongs to a much more advanced stage: it is frequently regarded as a learned and very late mode of time-reckoning. Modern man is almost entirely without knowledge of the stars; for him they are the ornaments of the night-sky, which at most call forth a vague emotion or are the objects of a science which is considered to be very difficult and highly specialised, and is left to the experts. It is true that the accurate determination of the risings and settings of the stars does demand scientific work, but not so the observation of the visible risings and settings. Primitive man rises and goes to bed with the sun. When he gets up at dawn and steps out of his hut, he directs his gaze to the brightening east, and notices the stars that are shining just there and are soon to vanish before the light of the sun. In the same way he observes at evening before he goes to rest what stars appear in the west at dusk and soon afterwards set there. Experience teaches him that these stars

[1] Christians, pp. 388 ff. [2] Hale, p. 68.

vary throughout the year and that this variation keeps pace with the phases of Nature, or, more concretely expressed, he learns that the risings and settings of certain stars coincide with certain natural phenomena. Here, therefore, there lies ready to hand a means of determining the time of the year, and one which is indeed much more accurate than a method depending on a reference to the phases of Nature. However it would seem as if this mode of indicating time would require a greater knowledge of the stars, such as only few peoples possess, — as if it would constantly be necessary to observe a fresh star for each of the smaller divisions of time. This is not the case, since, as appears from statements already made, for the purpose of determining the seasons a star may be observed when it is stationed at other positions in the sky than on the horizon, e. g., very conveniently, at its upper culmination, but other positions, expressed by us in so many degrees above the horizon, may also serve. Just as the advance of the day is discerned from the position of the sun, so the advance of the year is recognised by the position of certain stars at sunrise and sunset. Stars and sun alike are the indicators of the dial of the heavens. A determination of this kind, however, is not so accurate as that from the heliacal risings and settings. Hence the latter pass almost exclusively or at least pre-eminently under consideration wherever, as in Greece, a calendar of the natural year is based upon the stars: sometimes however the upper culmination (*μεσουράνημα*) is also given. Finally the stars can also be observed at other times of night than just before sunrise or after sunset [1]: the Marshall Islanders, for instance, were accustomed to observe the signs of the weather at 4 a. m. With the lack of a means of accurately telling the time such an observation is very uncertain and unpractical, and is therefore seldom found.

In order to determine the time of certain important natural phenomena it is therefore sufficient to know and observe a few stars or constellations with accuracy and certainty. The Pleiades are the most important [2]. It has been asked why this

[1] See pp. 123, 125, 132, 136, 138, 139, 144. [2] On this special point Andree has collected much material, which has been considerably augmented by Frazer.

particular constellation, consisting as it does of comparatively small and unimportant stars, should have played so great a part, and the answer given is chiefly that its appearance coincides (though this is true of other stars also) with important phases of the vegetation. This is correct, but something else must be added. To create constellations in which terrestrial objects, animals, and men are arbitrarily seen requires no inconsiderable degree of imaginative power. The Pleiades however form themselves into a group without any aid from the imagination, and can without difficulty be recognised as such. It is because they are easy to recognise immediately that the observation of these stars plays so important a part. A similar case is that of the Magellanic Clouds, which, where they are visible, belong to the best known phenomena of the heavens, and we may also compare the dark starless patches which so largely occupy the attention of primitive peoples, although neither of these two phenomena is used in determining time, since neither can be observed at the favourable moment, viz. the twilight.

An account of the Bushmen shews how extremely primitive peoples may also observe the risings of the stars, may connect them with the seasons, and — which is indeed somewhat rare — may even worship them. The Bushmen perceive Canopus; they say to a child: — "Give me yonder piece of wood that I may put (the end of) it (in the fire), that I may point it burning towards grandmother, for grandmother carries Bushman rice; grandmother shall make a little warmth for us; for she coldly comes out; the sun shall warm grandmother's eye for us". About the same time as Canopus, Sirius appears, and a similar ceremony takes place. Sirius comes out: the people call to one another: — "Ye must burn (a stick) for us (toward) Sirius." They say to one another: "Who was it that saw Sirius?" One man says to the other: "One brother saw Sirius." The other man says to him: "I saw Sirius." The other man says to him: "I wish thee to burn a stick for us towards Sirius, that the sun may shining come out for us, that Sirius may not coldly come out." The other man says to his son: "Bring me the piece of wood yonder, that I may put it in the fire, that I may burn it towards grand-

mother, that grandmother may ascend the sky, like the other one", i. e. Canopus. The child brings him the piece of wood, he holds it in the fire. He points it burning towards Sirius, he says that Sirius shall twinkle like Canopus. He sings; he points to them with fire that they may twinkle like each other. He throws fire at them [1]. Canopus and Sirius appear in winter, hence the cold is connected with them. The ceremony just described is obviously a warming-incantation. It is said also that it will make the stars rise higher, for the higher they stand above the eastern horizon at sunrise and the more brightly they twinkle, the more nearly winter draws towards an end. The Hottentots connect the Pleiades with winter. These stars become visible in the middle of June, that is in the first half of the cold season, and are therefore called 'Rime-stars', since at the time of their becoming visible the nights may be already so cold that there is hoar-frost in the early morning. The appearance of the Pleiades also gives to the Bushmen of the Auob district the signal for departure to the *tsama* field [2].

The Euahlayi tribe also connect the Pleiades with the cold: they call the stars 'the Ice-maidens', imagine them to be covered with ice, and say that in winter they let ice drop on the earth and also cause the winter thunderstorms [3]. Another tribe danced in order to win the favour of the Pleiades; the constellation is worshipped by one body as the giver of rain, but should the rain be deferred, instead of blessings curses are apt to be bestowed on it [4]. The Arunta say that the Pleiades are seven maidens who ascended into heaven, but after many wanderings came back to Okaralyi, where they again gathered *ngokuta* fruit and danced in the women's dance. During this period the Pleiades are not to be seen in the sky, i. e. it is the time between the evening setting and the morning rising. Here therefore the constellation is connected with a phase of Nature, and the whole is mythologically explained. According to another Arunta myth the Pleiades are maidens who had danced at a circumcision ceremony. After they had taken part in all the ceremonies in which to-day the assistance of women

[1] Bleek and Lloyd, I, 338 f. [2] Schulze, p. 367. [3] Parker, p. 95; cp. above, p. 122. [4] Mc Kellar, quoted by Frazer, p. 307; cp. Ridley, p. 279; below p. 144.

is still requisite at this festival, they went back to their native district, whence they ascended to heaven and are now to be seen as the Pleiades. Not without reason did the circumcision most frequently take place at the season when the Pleiades rise at evening in the east and remain in the sky all night long (this is the case in the summer months), so that this prominent constellation was regarded as a spectator of the festivities connected with the rite [1]. The Pleiades therefore serve to determine the time of the feast, and this circumstance is again invested with a myth. A tribe of Western Victoria connected certain constellations with the seasons. The Pleiades are young maidens playing to a corroboree-party of young men, represented by the belt and sword of Orion. Aldebaran, 'the Rose-crested Cockatoo', is an old man keeping time for the dancers. This group corresponds with the months of November and December. As the year advances Castor and Pollux appear: they are two hunters who pursue and kill a kangaroo, Capella. The Mirage is the smoke of the fire at which the kangaroo is cooked by the successful hunters. Those two groups set forth the period of the summer. The breaking up of a prolonged drought is thus explained: — Berenice's Hair, which culminates in March, is a tree with three big branches. When a shower of rain has come, every drop is nevertheless sucked up by the dusty earth. A small cavity formed at the junction of the three branches has however retained a little water, and here it is imagined some birds drink. The winter stars are Arcturus — who is held in great respect since he has taught the natives to find the pupae of the wood-ants, which are an important article of food in August and September — and Vega, who has taught them to find the eggs of the *mallee*-hen, which are also an important article of food in October. The natives also know and tell stories of many other stars [2]. Another authority states that they can tell from the position of Arcturus or Vega above the horizon in August and October respectively when it is time to collect these pupae and these eggs [3]. An old chief of the Spring Creek tribe in Victoria taught the

[1] Strehlow, pp. 9 and 19 ff. [2] Stanbridge, in MacPherson, pp. 71 ff. [3] Brough-Smyth, in Kötz, p. 43.

young people the names of the favourite constellations as indications of the seasons. For example when Canopus at dawn is only a very little way above the eastern horizon, it is time to collect eggs; when the Pleiades are visible in the east a little before sunrise, the time has come to visit friends and neighbouring tribes [1].

The Chukchee form out of the stars Altair and Tarared in Aquila a constellation named *pchittin,* which is believed to be a forefather of the tribe who, after death, ascended into heaven. Since this constellation begins to appear above the horizon at the time of the winter solstice, it is said to usher in the light of the new year, and most families belonging to the tribes living by the sea bring their sacrifices at its first appearing [2].

Among the N. American Indians the determination of time from constellations is rare. The Blackfeet Indians regulate their most important feasts by the Pleiades; a feast is held about the first and the last day of the occultation of these stars. It includes two sacred vigils and the solemn blessing and planting of the seed, and is the opening of the agricultural year [3]. According to another legend of the same tribe, the Pleiades are seven children who ascended into heaven because they had no yellow hides of the buffalo calves. Therefore the Pleiades are invisible during the time when the buffalo calves are yellow (the spring). But when these turn brown, in autumn, the lost children can be seen in the sky every night [4]. Among the Tusayan Indians of Arizona the culmination of the Pleiades is often used to determine the proper time for beginning a sacred nocturnal rite [5].

The S. American Indians have much greater knowledge of the stars, and in consequence frequently connect stellar phenomena, especially those of the Pleiades, with phases of Nature. In north-west Brazil the Indians determine the time of planting from the position of certain constellations, in particular the Pleiades. If these have disappeared below the horizon, the regular heavy rains will begin. The Siusi gave an accurate ac-

[1] Dawson, quoted by Frazer, p. 308. [2] Bogoras, II, 307. [3] L'Heureux, *JRAI, 15,* 301. [4] Wilson, quoted by Andree, p. 364; Mc Clintock, quoted by Frazer, p. 311. [5] Fewkes, quoted by Frazer, p. 312.

count of the progress of the constellations, by which they calculate the seasons, and in explanation drew three diagrams in the sand. No. 1 had 3 constellations: — 'a Second Crab', which obviously consists of the three bright stars west of Leo, 'the Crab', composed of the principal stars of Leo, and 'the Youths', i. e. the Pleiades. When these set, continuous rain falls, the river begins to rise, beginning of the rainy season, planting of manioc. No. 2 had 2 constellations: — 'the Fishing-basket', in Orion, and *kakudzuta,* the northern part of Eridanus, in which other tribes see a dancing-implement. When these set, much rain falls, the water in the river is at its highest. No. 3 was 'the Great Serpent', i. e. Scorpio. When this sets there is little or no rain, the water is at its lowest [1]. The natives of Brazil are acquainted with the course of the constellations, with their height and the period and time of their appearance in and disappearance from the sky, and according to them they divide up their seasons. In the valley of the Amazon it is said that during the first few days of the appearance of the Pleiades, while they are still low, birds, and especially fowls, roost on low branches or beams, and that the higher the constellation rises the higher the birds roost also. These stars bring cold and rain: when they disappear the snakes lose their poison. The canes used for arrows must be cut before their appearance, or else the arrows will be worm-eaten. The Pleiades disappear, and appear again in June. Their appearance coincides with the renewal of the vegetation and of animal life. Hence the legend says that everything that has appeared before the constellation will be renewed, i. e. its appearance marks the beginning of spring [2]. The Bakairi reckoned by natural phases, but were also well acquainted with astronomical signs, and spoke of certain constellations which reappeared at the beginning of the dry season: they referred to stars in the vicinity of Orion, 'the Manioc-pole' [3]. The Tamanaco of the Orinoco called the Pleiades 'the Mat'. They recognised the approach of winter from the signs of Nature [4], but also from the fact that the Pleiades at sunset were not too

[1] Koch-Grünberg, II, 203 ff. [2] Teschauer, pp. 734 ff. [3] von den Steinen, *Globus,* p. 245. [4] Cp. above p. 49.

far distant from the western horizon: the evening setting falls at the beginning of May [1]. The Lengua Indians of Paraguay connect the beginning of spring with the rising of the Pleiades, and at this time celebrate feasts which are generally of a markedly immoral nature [2]. The Guarani of the same country recognised the time of sowing by the observation of the Pleiades [3]. The Guarayu call the Pleiades *piangi;* when they disappear the dry season begins, and when Orion is no longer visible a period of cold dew begins. The Chacobo of north-eastern Bolivia regulate the time of sowing by the position of the Pleiades in relation to the spot where the sun rises [4]. The Chané and Chiriguano do the same. When the Pleiades rise above the horizon very early in the morning, the time for sowing has come: it is important for this to be finished before the rainy season sets in [5]. Still further tribes, for which I refer to Frazer, relate myths about the Pleiades, worship them, and celebrate feasts at their appearance. So did the inhabitants of ancient Peru, who called the Pleiades 'the Maize-heap' [6]. It might probably be thought that the observation of the Pleiades has spread from this ancient civilised people among the inhabitants of S. America, but it is of so primitive a character that it rather appears to have been one of the rudiments of the astronomical knowledge of the people of the Incas.

In Africa also the observation of the stars, and above all of the Pleiades, is wide-spread. In view of the dissemination of this knowledge all over the world it is making a quite unnecessary exception to state that it came into Africa from Egypt. Moreover this assertion does not correspond with the facts, since among the Egyptians Sirius, and not the Pleiades, occupied the chief place. The observation of the appearance of Canopus and Sirius we have already found highly developed among the Bushmen, that of the Pleiades among the Hottentots. The Bechuana of Central S. Africa are directed by the positions of certain stars in the heavens that the time has arrived in the revolving year when particular roots can be dug

[1] Gilij, II, 21. [2] Grubb, quoted by Frazer, p. 309. [3] De Angelis; Frazer, p. 309. [4] Nordenskiöld, *Indianer och hvita,* pp. 173, 113. [5] Id., *Indianlif,* p. 169. [6] Frazer, p. 310, with references.

up for use, or when they may commence their labours of the field. This is their *likhakologo* ('turnings' or 'revolvings'), at what we should call the spring-time of the year. The Pleiades they call *selemela,* which may be translated 'cultivator' or 'the precursor of agriculture' (from *lemela,* 'to cultivate *for*', and *se,* a pronominal prefix, distinguishing these stars as the actors). When the Pleiades assume a certain position in the heavens it is the signal to commence cultivating their fields and gardens [1]. The Caffres determine the time of sowing by observing the Pleiades [2]; the Bantu tribes of S. Africa regard their rising shortly after sunset as indicating the planting-season [3]. The Amazulu call the Pleiades *isilimela,* which has the same meaning as the Bechuana name, since they begin to dig up the soil when the Pleiades appear. The people say: '*isilimela* dies and is not seen', and at last, when winter is coming to an end, it begins to appear, one of its stars first and then three, until, continuing to increase, it becomes a cluster of stars and is perfectly clearly seen when the sun is about to rise. Then they say: '*isilimela* is renewed', 'the year is renewed', and they begin to dig [4]. Among the Thonga the Pleiades are the only constellation which bears a name — *shirimelo;* it rises in July and August, when tilling is resumed [5]. At the southern corner of Lake Nyassa the rising of the Pleiades early in the evening gives the sign to begin the hoeing of the ground [6]. The Kikuyu of British East Africa say that this constellation is the mark in the heavens to shew the people when to plant their crops: they plant when it is in a certain position early in the night. A dancing-song begins: — "When the Pleiades meet the moon, the people assemble etc." [7]. The Masai know whether it will rain or not according to the appearance or non-appearance of the Pleiades, and the last month of the period of the great rains, in which their evening setting falls, is named after them. When they are no longer visible the people know that the great rains are over, and they are not seen again until the following season — the season of

[1] Moffat, quoted by Frazer, p. 316. [2] Kidd: Frazer, p. 116. [3] McCall Theal: Frazer, p. 316. [4] Callaway, p. 39. [5] Junod, *Thonga,* II, 286. [6] Stannus, p. 289. [7] Hobley, *JRAI, 41,* 442.

showers — has come to an end. The Masai call the sword of Orion 'the Old Men', and his belt 'the Widows' who follow them [1].

To the Isubu in Kamerun the constellations, which they combine in certain groups, shew the course of the seasons; such constellations are e. g. *tole a nyou,* the *tole* of the elephants, in contradistinction to *tole a moto,* the *tole* of men; another is 'the Orphans'. These are summer signs, they are all found in the eastern part of the sky [2]. In Sierra Leone the proper time for planting is shewn by the position in which the Pleiades are to be seen at sunset: the Bullom do not observe or name any other stars [3]. The Bakongo associate these stars with the rainy season: the rain comes from them, they are called 'the Caretakers-who-guard-the-rain' [4]. When the constellation *kole* [5] reaches the meridian, the Bangala plant more than at any other time, because the rains, though not infrequent, are then fairly certain [6]. In Loango Sirius is called 'the Rain-star', since as long as he is visible the rains persist. Alongside of him Orion is regarded as a sign of the rainy season [7]. In French Guinea the people know that when the winter constellations appear above the horizon, indicating that the end of the rains has come, it is the time of harvest [8].

In the Indian Archipelago the observation of the Pleiades is the most general and frequent means of determining the time for tillage. Hence these stars are mythologically regarded as the originators of the rice-culture. The Dyaks of Sarawak say that Si Jura on a sea-voyage once found a fruit-tree with its roots in the sky and the branches hanging downwards. He climbed up into it, and since his comrades sailed away, he was obliged to climb on and on until he reached the roots and found himself in a strange land — the country of the Pleiades. There Si Kira received him kindly, and invited him to eat. "Those little maggots?" replied Si Jura. Si Kira answered: — "They are not maggots, but boiled rice", and he explained to

[1] Hollis, *Masai,* pp. 275 ff.; cp. below, pp. 201 f. [2] *Globus, 82,* 1902, p. 177. [3] Winterbottom, quoted by Frazer, p. 318. [4] Weeks, *Bakongo,* pp. 293 ff. [5] See above, p. 93. [6] Weeks, *39,* p. 129. [7] *Loango Exp.,* III: 2, pp. 135 and 138. [8] Arcin, p. 394.

his guest how the rice was cultivated and reaped, and then let him down by a long rope near to his father's house. Si Jura taught the Dyaks how to cultivate rice, and the Pleiades themselves tell them when to farm; according to the position of these stars in the heavens, morning and evening, they cut down the forest, burn, plant, and reap [1]. In another legend the Pleiades are six chickens which the hen follows, invisible; formerly there were seven, and at that time men did not know of rice, but lived on the products of the forest. One of the chickens had come down to earth, where men gave it to eat: it would not eat, however, but brought them a fruit with three husks, in which there were contained three kinds of rice, that would ripen in four, six, and eight months respectively. The hen was angry, and wished to destroy both men and the chicken: the former were saved by Orion, but only six chickens were left. During the time in which the Pleiades are invisible, the hen is brooding, but the cuckoo calls as long as they are visible [2]. The Sea-Dyaks determine the time of sowing by observing the Pleiades. Some tribes determine the approach of the time of rice-sowing from the observation of the stars. The Kayan of Borneo know the most important constellations, although they do not observe them and their motions with a practical end in view [3]. However one of the joint authors just quoted says in another place that although the Kayan more usually determine the time of sowing by the observation of the sun, yet both they and many other races in Borneo sow the rice when the Pleiades at daybreak appear just above the horizon [4]. When the time to clear fresh land in the forest draws near, a wise man is appointed to go out before dawn and watch for the Pleiades. As soon as they are seen to rise while it is still dark, the people know that the time has come to begin work, but not until they are at the zenith before dawn is it considered desirable to burn the fallen timber and sow rice. The Dyaks begin the rice-planting when the Pleiades reach the same position at about 3 or 4 o'clock in the morning as

[1] St. John, I, 213 ff. [2] Schaank, quoted by Andree, p. 364. [3] Hose and McDougall, I, 109; II, 139, 213. [4] Hose, *JRAI, 23,* p. 168.

the sun reaches at 8 o'clock. Old and experienced men are on the watch to determine the spot exactly. Then a feast begins [1]. The natives of Nias, an island to the south of Sumatra, assemble to till their fields when the Pleiades appear, and regard it as useless to do so before that time [2]. In Sumatra also the time for sowing was determined in this way. The Batak of the middle of the island regulate their various agricultural operations by the position of Orion and the Pleiades. The Achenese of the north know that the sowing-time has come when the Pleiades rise before the sun, at the beginning of July [3]. In northern Celebes the rice-fields are prepared for cultivation when the Pleiades are seen at a certain height above the horizon [4]. The Kai of German New Guinea say that the time for labour in the fields has come when the Pleiades are visible above the horizon at night: the Bukaua of the same country also follow the Pleiades [5]. When the natives of the Torres Straits Islands see the Pleiades on the horizon after sunset, they say that the new yam-time has come [6]. The western tribes of these straits have names for many stars, which are largely grouped into constellations. The seasonal appearances of certain stars or constellations were noted, and their rising regulated particular dances, and also, as our authority thinks, the planting of yams and sweet potatoes [7].

Accurate information for these tribes is given by Rivers in the Reports of the Expedition to the Torres Straits. The most important constellations are 'the Shark' (= the Great Bear together with Arcturus) and *corona borealis*. Still larger is *Tagai*. This constellation represents a man, Tagai (= Centaurus, Lupus), standing in the prow of a canoe (Scorpio); in the stern sits Kareg (Antares). Tagai holds in his left hand (the Southern Cross) a fishing-spear, in his right (Corvus) some *kupa*-fruit. Below the canoe is a sucker-fish, consisting of a part of Scorpio. *Naurwer* are 'the Brothers' — Vega the elder, and Altair the younger — who in their outstretched arms are holding sticks (β, γ *lyrae*, β, γ *aquilae*). In Mabuiag this constellation is called

[1] Schaank, quoted by Andree, p. 364. [2] Nieuwenhuisen, quoted by Frazer, p. 315. [3] Marsden: Frazer, p. 315. [4] von Spreeuwenberg: Frazer, p. 313. [5] Neuhauss: Frazer, p. 313. [6] Haddon: Frazer, *ibid.* [7] Haddon, p. 303.

Dogai. Our Delphinus is called 'the Trumpet-shell', *kek* is probably Achernar. Others I omit. The most important star was *kek,* whose rising indicated not only the beginning of many ceremonies but also the planting-season. The risings and settings of the stars were observed, and certain rites and agricultural occupations regulated thereby. In Badu it was said that when only the tail of the Shark is above the horizon, the north-west wind begins to blow 'a little bit': when the tail has gone down altogether, the people begin to plant yams, and when the Shark comes up again, yams, sweet potatoes, and bananas are ripe. The stars also help to determine the seasons. A native of Mabuiag gave the following list of the stars relating to the season called *aibaud:* — *kek* comes up, he is the sign for everything to be done: 'start meeting', i. e. at the feasts the holding of which is dependent upon plentiful supplies of food; *gil, usal* (the Pleiades): at this time the ovaries of the turtles enlarge; *pagas* and *dede* (Beteigeuze); *utimal; wapil.* Towards the end of the season the Shark becomes visible, and then the pigeon migrates from New Guinea to Australia, as does the *birubiru*-bird when *gitulai* (the Crab) appears. It is expressly noted that when the people speak of the rising or setting of a constellation or star at a certain season, they have in mind the time of the year when the star or constellation in question first appears or disappears on the horizon at daybreak. Of Tagai a catasterism is related which at the same time has reference to the phenomena of the seasons at the appearance of the stars in question. On a fishing expedition the crew stole the water from him and Koang. They therefore killed them and said: — "Usal (the Pleiades), you go to New Guinea side, when you come up there will be plenty of rain. Utimal, you go to New Guinea side, you have to bring rain. Kwoior, when you come up over Mangrove Island just before the south-east monsoon sets in, there will be rain in the morning. Then the wind will shift and it will rain in the afternoon, and you, Kek, will come up in the south between Badu and Moa and it will be cold weather. When you go round this way and when you come up, then the yams and sweet potatoes will

ripen. You all have work to do" [1]. A similar story is told of the Kiwai Papuans, who have for the most part the same star-names and call most of their months after stars: the Shark is also implicated in this story. When the fin sets, there is more wind and high-water; when the tail sets, more high-water; when the head rises, the copulating-season of the turtles commences. Another myth tells how Javagi got angry and threw Karongo up into heaven, where he and his three-pronged spear became the constellation Antares [2].

The Melanesians of Banks Island and the northern New Hebrides are also acquainted with the Pleiades as a sign of the approach of the yam-harvest [3]. The inhabitants of New Britain (Bismarck Archipelago) are guided in ascertaining the time of planting by the position of certain stars [4]. The Moanu of the Admiralty Islands use the stars as a guide both on land and at sea, and recognise the season of the monsoons by them. When the Pleiades *(tjasa)* appear at night-fall on the horizon, this is the signal for the north-west wind to begin. But when the Thornback (Scorpio) and the Shark (Altair) emerge as twilight begins, this shews that the south-east wind is at hand. When 'the Fishers' Canoe' (Orion, three fishermen in a canoe,) disappears from the horizon at evening, the south-east wind sets in strongly: so also when the constellation is visible at morning on the horizon. When it comes up at evening, the rainy season and the north-west wind are not far off. When 'the Bird' *(canis major)* is in such a position that one wing points to the north but the other is still invisible, the time has come in which the turtles lay eggs, and many natives then go to the Los-Reys group in order to collect them. The Crown is called 'the Mosquito-star', since the mosquitoes swarm into the houses when this constellation sets. The two largest stars of the Circle are called *pitui an papai:* when this constellation becomes visible in the early morning, the time is favourable for catching the fish *papai* [5]. The natives of the Bougainville Straits are acquainted with certain stars, especially the Pleiades; the rising of this constellation is a sign

[1] *R. T. Str.*, pp. 218 ff. [2] Landtman, pp. 482 ff. [3] Codrington, p. 348. [4] Brown, p. 332. [5] Parkinson, pp. 377 ff.

that the *kai*-nut is ripe: a ceremony takes place at this season [1]. On Treasury Island a grand festival is held towards the end of October, in order — so far as could be ascertained — to celebrate the approaching appearance of the Pleiades above the eastern horizon after sunset. In Ugi, where of all the stars the Pleiades alone have a name, the times for planting and taking up yams are determined by this constellation [2]. In Lambutjo the year is reckoned according to the position of the Pleiades. When they are in the east, it is said that 'they are waiting', when at the zenith, 'they stand in the middle', when in the west, they are 'bowed down'. When they stand low, the turtles come up on land: the people say that they 'go to play', i. e. it is the pairing season. When the Pleiades are high overhead, the white men celebrate Christmas. When they 'come up anew', the people go to look for fish. At that time 'the Fishes' are in the water. 'The Fishes' *(corona borealis)* dip down when the Pleiades come up. When 'the Fishes' are in the sky, there are no fish in the water. In both Alu and Lambutjo one division of the year is reckoned by the return of the Pleiades, another by the almond-ripening. On the Gazelle Peninsula the time for good fishing is the time of the appearance of the Pleiades: at this time the fishing-nets are spread out. It is said that 'the Thornback' (Pisces) and 'the People-at-the-feast' (the Pleiades) must not see each other; the former constellation is called *galial* ('fishes'), which at this time are not to be eaten [3]. On the island of Saa, one of the Solomon Islands, the Southern Cross is the net with four men letting it down to catch palolo, and the Pointers are two men cooking what is caught, since the palolo first comes when one of the Pointers appears above the horizon [4]. In the list of star-names given for the Carolines there are also references to the seasons. In Ponape *le-poniong* is seen at the time of the variable winds. In Lamotrek Corvus is called 'the Viewer-of-the-taro-patches', since he is visible during the taro season; the name of Arcturus is formed from *ara,* 'to conclude', and *moi,* 'to come', and the star is so called because his rising indicates the end of the

[1] Wheeler, p. 37. [2] Guppy, quoted by Frazer, p. 313. [3] Thurnwald, pp. 340 ff. [4] Codrington, p. 348.

north-east winds, which bring visiting parties to the island; the appearance of Capella means heavy gales and bad weather[1].

Among the astronomically learned Polynesians time-estimations according to stars play an important part: most of these however belong to the chapters on the months and the year. In Samoa it is at present an exception if an old fisherman can indicate and name this or that star which at its entrance into this or that constellation *(sic!)* announces the beginning of an abundant *bonino*-catch, the immediate return of the South Sea herring, the *atuli,* to its accustomed spawning-grounds, or some other similar event of importance in the life of the natives[2].

When the stars indicate this or that event, the primitive mind, as so often happens, is unable to distinguish between accompanying phenomena and causal connexion; it follows that the stars are regarded as authors of the events accompanying their appearance, when these take place without the interference of men. So in ancient Greece the expressions (a certain star) 'indicates' (*σημαίνει*) or 'makes' (*ποιεῖ*) certain weather were not kept apart, and the stars were regarded as causes of the atmospheric phenomena[3]. A similar process of reasoning is not seldom found among primitive peoples, and a few instances have already been given, such as the warming-incantation of the Bushmen against Canopus and Sirius, the name given to the Pleiades among the Bakongo ('the Caretakers-who-guard-the-rain'), and the belief that the rain comes from them, the myth of the Euahlayi tribe that the Pleiades let ice fall down on to the earth in winter and cause thunderstorms, in other words send the rain, and the belief of the Marshall Islanders that the various positions of certain stars cause storms or good winds[4]. The same idea is very clearly seen in the account of the Hottentots given by a missionary of the 17th century[5]. At the return of the Pleiades the natives celebrate an anniversary: as soon as the stars appear above the eastern

[1] Christians, pp. 388 ff. [2] von Bülow, *72,* p. 238; the author expresses himself erroneously, as if it were a case of the entrance of a planet into a constellation, instead of the position of a fixed star. [3] Pfeiffer, pp. 1 ff. [4] See above, pp. 130 f., 137, 131, 125 f.. [5] G. Schmidt, quoted by Frazer, p. 317.

horizon the mothers lift their little ones in their arms, run up to some eminence, and shew to them these friendly stars, and teach them to stretch out their hands towards them. The people of the kraal assemble to dance and sing according to the old custom of their ancestors. The chorus is always: "O Tiqua, our father above our heads, give rain to us that the fruits (bulbs etc.), *uientjes,* may ripen and that we may have plenty of food: send us a good year!"

The natives of Australia (perhaps of Victoria), according to an old account, worship the heavenly bodies and think that natural causes are governed by certain constellations. They have names for these, and sing and dance to win the favour of the Pleiades, which are worshipped by one group as the giver of rain; should the rain be deferred, curses instead of blessings are bestowed on them [1]. The Euahlayi tribe thinks that the Pleiades bring frost and winter thunderstorms, and that the Milky Way by its change of position brings rain [2]. An old native, chief of the Gingi tribe, when the rain would not stop, turned to the souls of his dead friends in the Milky Way with certain charms, until they made the rain cease. The Milky Way is regarded as a stream with fertile banks [3].

These facts being so, there is nothing strange in an account which unfortunately comes from a writer whose evidence in other respects is open to grave doubt. We are told that Andy, a native of New South Wales, found the statement that the sun is the source of heat ridiculous, and said: — "If the sun makes the warm weather come in summer-time, why does he not make the winter warm, for he is seen every day?" The influence which produces heat, in the belief of the natives, accompanies the Pleiades. When these are visible at a certain altitude above the horizon, it is spring, *begagewog;* when they rise to their highest altitude, it is summer, *winuga;* when in autumn they sink down again towards the horizon, it is *domda* ('autumn'); in winter they are barely visible or are lost to view altogether; it is then winter *(magur),* and cold. The ordinary stars have no kind of influence on the seasons, but

[1] Ridley, p. 279. [2] Parker, pp. 95 ff.; cp. above, p. 131. [3] Ridley, p. 273.

simply the Pleiades [1]. The account agrees very well with what is otherwise known of the stellar science of the Australians, and is perfectly credible. A precisely similar story comes from the other side of the globe. At the beginning of the 18th century, when the Lapps were still heathens, one of the questions which a missionary among these people put to them about their gods was: — "Have you prayed the Pleiades to warm the weather?" In accordance with this a Lapp myth relates that a servant driven out on a very cold night by a cruel master was saved by the Pleiades. One of the Lapp names for these stars, which evidently points to this idea, is 'the Sheep-skins' [2]. The Greeks had the same belief in Sirius as the cause of the summer heat. [3]

From this belief in the stars as causes of the natural phenomena it is but a short step to attempt to draw from the manner of their appearance conclusions as to the kind of phenomenon caused by them. To the Bakongo the Pleiades are the guardians of the rain, and when they are clearly to be seen at the beginning of the rainy season the people expect a good season, i. e. sufficient but not too much rain [4]. The Nandi of British East Africa know by the appearance or non-appearance of the Pleiades whether they may expect a good or a bad harvest [5]. The Guarayu of S. America believe that when the Pleiades at their reappearance are surrounded by a circle, it is a good omen: but if this circle is wanting, all must die [6]. In Macedonia the Pleiades are called 'the Clucking or Brooding Hen' (ἡ κλωσσαριά); their setting announces the advent of winter, and from the accompanying conditions omens are drawn as to the quantity of the forthcoming crop and the fertility of the cattle. If the constellation sets in a cloudy sky, this portends a rich harvest [7]. Similar weather-rules and prognostications are found in abundance in modern European folklore and in the so-called peasants' calendars. The origin in the popular astrological beliefs of antiquity is usually taken for granted. It is true that astrology, especially under Mo-

[1] Manning, p. 168; cp. Frazer, p. 308. [2] Reuterskiöld, pp. 72 and 119. [3] Above, p. 112. [4] Weeks, *Bakongo*, pp. 293 ff. [5] Hollis, quoted by Frazer, p. 317. [6] Nordenskiöld, *Indianer och hvita*, p. 173. [7] Abbot, p. 70.

hammedan influence, has penetrated very deeply even among little civilised peoples such as the negroes of Central Africa and the Malays of the Indian Archipelago; but I see no cogent reason for finding in the above-mentioned world-wide examples of a belief in the influence of the stars upon natural phenomena any influence of that astrology which derives from ancient Babylon. Rather do these myths and traditions seem to afford an analogy to the initial stages of the Babylonian astrology, and to shew that the whole vast system of astrology had its root in primitive thinking. And the Babylonian prognostications from stars and sky remained, until a very late period, quite primitive. These observations cannot be followed up further: astrology and its origins lie outside the limits of the present study.

It has been shewn, then, that even among the most primitive peoples of the globe the stars are known, observed, considered, and used for the determination of time — the Pleiades, indeed, first and foremost, but other constellations as well; of the not nearly so frequent determination of the advance of night from the motions of the stars we have already spoken in chapter I. There is however a difference that should not be neglected between this method of determining time and the time-indications from natural phases. So far as I have been able to discover, the stars are never used in a narrative, i. e. where the date of any familiar event is to be given, but only where practical rules for the constantly recurring occupations and labours are concerned, and also for the festivals. The method therefore does not apply to the historical event in the wider sense, but only to the reiterated event the recurrence of which is empirically known. The consciousness of a fixed and constant order is therefore impressed upon the mind of primitive man much more powerfully by the eternal revolution of the constellations than by the variation of the seasons.

CHAPTER V.

THE MONTH.

The course of the sun determines the variation between day and night, and causes the natural phases of the year. From the position of the sun the times of the day can be given with ease and certainty, but not so the seasons of the year, — to the exceptions I shall recur in chapter XII. From the fixed stars the hours of the night can be determined, and still more frequently are the seasons regulated by them. But this kind of time-determination necessarily refers to points of time, and not to periods. Only for one or two days has the star the position which serves for the determination of time. No division of the year into parts can be carried out by this method, the most that can be done is to regulate the already existing divisions by it.

As well as the sun and the fixed stars the moon appears in the heavens. It does not entirely vanish before the sunlight like the fixed stars, in the night-time its light eclipses that of the smaller stars. Its shape, the strength of its light, and the time of its appearance vary quite perceptibly from day to day. As long as the human race has existed, man's attention must have been drawn to the moon. The course of the moon, thanks to the rapid revolution of the planet round the earth, forms a shorter unit, which steps in between day and year. The shorter interval of time defined by it, unlike the too lengthy period of the year, is easily kept in mind and taken in at a glance. This unit has further its peculiar characteristics. In the first place it has nothing to do with the natural phases conditioned by the course of the sun: it is in fact incommensurable with the seasons. In the second place it immediately obtrudes itself

into notice as a unit. The time-reckoning according to the moon is in its nature continuous. One moon follows another with a short interruption, to which at first little attention is paid: for compared with the 27—28 days in which the moon can be seen in the sky the 1—2 days in which it is invisible are little noticed. The phases of the moon represent a gradual waxing and waning, a continuous development. The principle of continuous time-reckoning is therefore suggested by the moon, in opposition to the time-indications from natural phases and from the stars.

The observation of the moon is often said to be the oldest form of time-reckoning. This statement involves a certain danger, viz. the overlooking of the fact that the time-indications from natural phases and from the stars — as I hope has been shewn above — are just as primitive and must be just as old. But if by time-reckoning the continuous principle and measure of time are implied the statement is in that sense true. The moon is indeed the first chronometer, and this fact is due to the nature of its concrete appearance, which draws attention to the duration, and not to the point, of time. And this, as always, is the starting-point: practically everywhere the month as a unit of enumeration or a measure is denoted by the same word as the moon. The linguistic distinction between 'moon' and 'month' only follows at a stage which primitive peoples still living have not yet reached. All peoples know the moon and use it for time-reckoning. Of the S. American Indians, who observe the stars so well, it is stated that the month is everywhere the natural division of time [1].

While the human mind therefore arrives only gradually at the conception of the year, the month is already given by the natural phenomenon. Consequently it is only to be expected that it should be expressly stated that the revolution of the moon determines the greatest measure of time [2], and that we should find peoples who can count reckoning by months and not by years. Thus, for example, it was often said in southern Nigeria: "I sold this canoe to him eight moons ago" [3]. As in

[1] Nordenskiöld, *Kulturhist.*, p. 219. [2] The Caffres—Alberti, p. 68; probably also among the 'wild' Kubu of Sumatra — Hagen, p. 155. [3] Partridge, p. 244.

the counting of the years a well-known event is used as a starting-point, so it is also with the months. In the New Hebrides they said: — "Two moons have gone since this or that event took place" [1]. But this principle has not prevailed in the counting of the months, since it gives too many months in the course of one human life, and since the months are drawn into another connexion, to which the following chapter is devoted. Only in one case is a reckoning of this nature common, viz. in pregnancy. Examples are superfluous, but I give at least one: — The Samoan woman looks at the moon and expects the beginning of menstruation at a quite definite position of that planet, each woman naturally having a different position of the moon in view. If menstruation does not take place then, she perceives that she is pregnant, and expects her confinement after ten moon-months [2].

No attention is paid at first to the number of days in the month: many primitive peoples cannot even count so far as thirty. A significant passage in a Ho text originating from a native runs: — "The months are reckoned from the moon (the same word is used for both), which stands in the sky. When the moon appears, remains long in the heavens, and then again for a short time is invisible, we say that a month has just gone. We know nothing about the number of days constituting a month. When we see the moon and then it is lost again a month has gone" [3]. A native Basuto says that little regard is paid as to counting the number of days in any month, since the bulky moon itself fills up the deficiency [4]. When men begin to count the days great uncertainty at first prevails: in Buin, for example, the statements vary between 15 and 31 days [5]; the Caffre month is said to have 25 days. Apparently only the time during which the moon is visible is at first counted. So it is said of the Caffres that they count the month from the phases of the moon during its visibility, and that the days of its invisibility are not counted: the moon has gone to sleep [6]. For the Basuto on the other hand only expressions for the two days of the moon's invisibility are mentioned: the first,

[1] Oliveau, p. 343. [2] von Bülow, *93*, 251. [3] Spieth, p. 311. [4] Sechefo, *4*, p. 931. [5] Below, pp. 158 f. [6] Macdonald, p. 291.

'the moon has gone into the dark', the second, 'the moon is greeted by the apes', since this animal can see the moon sooner than man [1]. The Ibo-speaking peoples also reckon only 28 days to the month [2], and so do the Dakota [3]. It is only natural that the days of the darkness should soon be included, so that the following month follows directly upon the preceding; many peoples say, like the Banyankole, that the month lasts 29 days: for 28 days the moon is visible, and for one day hidden [4]. As always, therefore, the concrete phenomenon is the starting point. Here, however, not only the varying shape of the moon, not only its phases, are taken into account, but also, as in the case of the sun and the stars, its position in the sky. On the analogy of the rising and setting of the stars the new moon can be described as the evening setting, the full moon as the evening rising or morning setting, and the disappearing of the moon as the morning rising of that planet. A description of this nature, of course without the above scientific terminology, does occur, but in isolated instances. In the above-mentioned Ho text a further passage runs: — "When the moon appears and comes nearer, we say 'it stands overhead'. After this it stands in the middle (of the sky). When the moon does not rise until after night-fall we say that it 'stands on the edge (of the sky)'. When it does not rise until very long after night-fall we say 'it shines unto day-break'. When the moon is once more on the wane, it will not be long before another appears." Other expressions are: — 'the moon falls upon the forest', i. e. stands low on the horizon, 'it sleeps in the open air', when it is in the sky at day-break [5]. At the south of Lake Nyassa the day of the month is denoted by indicating the position of the moon in the sky at day-break [6]. Of the Seminole of Florida it is reported that the months seem to be divided simply into days, and that the latter are, at least in part, described by reference to the successive positions of the moon in the sky at sunset. When our informant asked a native how long he would remain at his present camp, he answered by pointing to the new moon in

[1] Sechefo, p. 932. [2] Thomas, *Ibo*, p. 127. [3] Schoolcraft, II, 177. [4] Roscoe, *Bantu*, p. 140. [5] Spieth, p. 556. [6] Stannus, p. 288.

the west, and sweeping his hand from west to east to the spot where the moon would be when he should go home. He meant to answer, "About ten days hence" [1].

To indicate the day by the position of the moon in the sky is however exceptional, and it is just as exceptional for descriptions of the day according to the position of the moon to be consistently carried out. The Ewe tribes also have expressions which refer to the shapes of the moon. These different shapes have in general attracted most attention, and serve for time-reckoning. At first the phases of the moon are distinguished only roughly, but greater and greater refinement of observation is ever being attained, until every day of the moon's revolution is described by a name, and the names not only refer to the phases of the moon but also indicate its position in the sky.

Among the different phases of the moon's light two stand out with especial prominence — the first appearance of the crescent of the new moon in the evening twilight, and the full moon. Both events are joyfully greeted and celebrated among many peoples, in particular the appearance of the new moon, the full moon also, but not so often. The explanation of this fact must partly lie in the circumstance that the full moon does not suddenly appear like the new moon, but fills its disc gradually, so that the days of full moon are more numerous, instead of being one exactly determined day like the day of the new moon. Hence there may be a counting of the months in new moons instead of a continuous reckoning in moons, as when the natives of the Solomon Islands count the months which must elapse before the funeral feast by making a notch in a stick or a knot in a rope at the appearance of the new moon [2].

The hailing of the new moon with joy is wide-spread [3]. The Dieri of Australia relate that there was once no moon, so that the old men held a council and a Mura-mura gave them the moon; in order that they might know when to hold their ceremonies, he gave them a new moon at certain intervals [4].

[1] Mac Caulay, p. 525. [2] Thurnwald, p. 331. [3] See further Frazer, IV: 2, 140 ff. [4] Howitt, p. 428.

Heathen Eskimos in West Greenland celebrate at every new moon a feast with a performance of the sorceror, an extinguishing of lamps, and the barter of women [1]. The Patagonians welcome the new moon by patting their heads and murmuring an incantation [2]. Certain tribes of North America at the eagerly expected appearance of the new moon uttered loud cries and stretched out their hands towards it [3]. The Natchez of Louisiana at every new moon celebrated a feast which took its name from the principal fruits reaped in the preceding moon, or from the animals that were usually hunted then [4]. In the villages of Port Moresby (British New Guinea) the people at the first sight of the new moon give a prolonged somewhat shrill cry which is taken up by all and repeated in chorus: there is no mention of any time-reckoning [5]. On the southern side of Dutch New Guinea we learn that the first sight of the new moon was signalised by a short sharp bark rather than a shout. Several times on the day following the first sight of the new moon our authority noticed that a spear decorated with white feathers was exposed in a conspicuous place in the village. The author states that he is unable to say whether this custom had any connection with the calendar [6]. In Buin at the appearance of the quarter *(sic!)* of the new moon the people immediately utter the 'war-cry', 'so that the new moon may not break the cocoa-nuts'. When the new moon comes up, the people of Buin trill with their under-lip, plucking at it with the forefinger and at the same time sending out a high note ('*a*'). In Lambutjo the people howl and strike themselves on the mouth with their hands, at the same time uttering '*a*', so that a kind of quacking is heard. On the Gazelle Peninsula the natives put their forefingers in their mouths and trill a high '*u*', the result being a gurgling noise [7].

The same custom recurs in Africa. When the Bushmen catch sight of the new moon they pray: — "Young Moon! Hail, Young Moon, hail, hail, Young Moon! Young Moon, speak to me, hail, hail, Young Moon! Tell me of something! Hail, hail! When the sun rises, Thou must speak to me, that I may

[1] Hanserak, p. 44. [2] Musters, p. 203. [3] Carver, p. 175. [4] Du Pratz, II, 354 ff. [5] Seligmann, p. 193. [6] Wollaston, p. 132. [7] Thurnwald, pp. 332 ff.

eat something. Thou must speak to me about a little thing, that I may eat. Hail, hail, Young Moon!" [1]. The Bechuana watch most eagerly for the first glimpse of the new moon, and when they perceive the faint outline after the sun has set deep in the west, they utter a loud shout of *kua!* and vociferate prayers to it, e. g. "Let our journey with the white man be prosperous!" [2]. The Ba-Ronga always greet the apparition of the new moon with cheers. The first person who sees it shouts *kengelekezee* (*kenge* = 'half-moon shaped'), and this exclamation is repeated from one village to another. According to a Nkuma informant the day of the new moon is *shimusi,* a day of rest. The appearance of the crescent was carefully examined. If the horns were turned towards the earth, this shewed that there was nothing to fear, the dangers of the month had been poured out. If the opposite was the case, it shewed that the moon was full of weapons and misfortunes [3]. As soon as the new moon is seen, the Banyankole of Uganda come out of their huts and clap their hands. Everyone lights a fire in front of his hut and lets it burn for four days continuously. A number of royal drums are brought out and beaten without cessation for four days [4]. The Wadschagga climb a hill in order to see the crescent properly, and pray at its appearance: — "One, two, three, four (the day of the new moon is reckoned as the fourth day of the month), give me peace, give me food, send me blessing, and drive want far away. O my moon, break him (my enemy) neck and throat!" Since in the evening so many curses are uttered, this day is also termed an evil day. Its peculiarities decide the character of the whole month. For this reason no one should go to rest on this evening hungry or only half-satisfied, or else he will be hungry the whole month long. The master of the house admonishes his wife: — "Day of the moon! Honour the moon, and go in quest of food for the children, that they may not go to sleep hungry every day." On this day no legal business is done and no debts are paid. But whoever can manage to get his debt paid on that day will

[1] Bleek and Lloyd, I, 415. [2] Livingstone, p. 235. [3] Junod, *Thonga,* I, 51; II, 283. [4] Roscoe, *Bantu,* p. 139 f.

have luck and his possessions will increase [1]. This custom is of a highly developed order and exactly resembles the well-known ancient Roman and modern New Year superstition, in which moreover the new moon also plays a prominent part; one can hardly avoid suspecting foreign influence. At Nibo when the new moon comes out they salute it with: — "*u-u*, don't let disease catch me, or a bad moon!"; the Ibo celebrate a children's festival at the time of the new moon [2].

The full moon also gives rise to special feasts: half Africa dances in the light of the nights of full moon. The Bushmen, for example, never neglected the dance at the time of the new and full moon. Dancing began with the new moon and was continued at the full moon [3]. In Dahomey the festivals take place at full moon, the days being fixed by the native government [4]. This is also the case elsewhere. The people of Timor on the night of the full moon dance from night-fall till sunrise: the dancing songs are principally of an erotic character [5]. On the Nicobars at new and full moon feasts were celebrated in which great quantities of an intoxicating beverage prepared from the juice of the cocoa-palm were drunk [6]. The Celtic Iberians of ancient Spain assembled outside their gates on the nights of full moon and celebrated a feast and danced in honour of an unknown god [7]. Who can help thinking here of the well-known words of Tacitus about the Germans? — "Their meetings are, except in case of chance emergencies, on fixed days, either at new moon or full moon: such seasons they believe to be the most auspicious for beginning business." [8]. A fact is here mentioned to which we shall recur below, viz. that the feasts and religious festivals are often celebrated during the time of full moon. This is due not only to the full light of the moon but also to the world-wide idea that everything which is to prosper belongs to the time of the waxing moon,

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[1] Gutmann, p. 238. [2] Thomas, *Ibo*, p. 127. [3] Stow, p. 112. [4] Foa, p. 120. [5] *Arch. f. Anthropol., 12*, 1913, p. 152. [6] Møller, p. 50. [7] Strabo, III, 4, 16 (p. 164). [8] *Coeunt, nisi quid fortuitum et subitum inciderit, certis diebus, cum aut inchoatur luna aut impletur: nam agendis rebus hos auspicatissimum initium credunt* — Tac., *Germ.*, XI.

and above all to the days when it has reached its complete phase [1].

New moon and full moon, therefore, by the religious significance attached to them, prove themselves to have been the two phases which were first observed. It is certainly no mere accident that in a word-list of an Australian tribe, the Kakadu of North Territory, only terms for new moon and full moon exist (*malpa nigeri* and *mirrawarra malpa* respectively) [2]. Starting from these two phases, the whole period of the moon can be divided into two halves, formed by the waxing and the waning moon. The phases are the same in both halves, but follow one another in the inverse order. Hence they can be described by the same word, with an additional word for the half of the month: but this is only vouched for in one instance, viz. for the Mendalam Kayan of Borneo [3]. On the other hand this division is extremely common, especially among more highly developed peoples, in the counting of the days of the month, to which I return below. Quite primitive peoples cannot count so far as 15, or do so only with difficulty: instead of this they distinguish still further phases of the moon.

In the next place the crescent of the wasting moon is added, so that three phases are given: waxing, culmination, and waning. Thus the Andamanese call the new moon *ogurlo-latika,* the full moon *ogur-dah,* and the waning moon *ogurboi-kal* [4]. Another writer gives different names, no doubt for another tribe: — New moon = 'moon-baby-small', first quarter = 'moon-big', full moon = 'moon-body', last quarter = 'moon-thin' [5]. The literal translation shews however that this author wrongly makes these phases equivalent to our quarters; the full moon and the third quarter are not identical. In reality, besides the full moon, two phases are distinguished during the time of the waxing moon, and only one when the moon is on the wane. The Indians of Pennsylvania distinguish by special names the new, the round (i. e. the full), and the waning moon: the last-named they call the half-round moon [6]. The Negritos

[1] With this section cp. Webster, ch. V, *Lunar Superstitions and Festivals.* [2] Spencer, p. 456. [3] Cp. below, p. 160. [4] Homfray, p. 61. [5] Man, p. 337. [6] Heckewelder, p. 527.

of Zambales have periods corresponding to the phases of the moon: the new moon they call *bay'-un bu'-an,* the full moon *da-a'-na bu'-an,* the waning moon *may-a'-mo-a bu'-an,* [1]. In Wuwulu and Aua there were words for the full moon, the waxing and the waning moon, and for the time of the moon's invisibility [2]. This last is not a phase in the proper sense: as soon as it was recognised, however, it was natural that it should be introduced as equivalent to the phases and should thus complete the circle of the month.

In regard to the further development of the phases it is to be noted that this does not as a rule take place with any regularity, but the phases are more specialised during the period of the waxing than in that of the waning moon. The Karaya of Central Brazil were overjoyed to note the first appearance of the crescent. Apparently five phases of the moon are distinguished, for which our authority obtained the following names from an Indian: — First crescent, *ahandu loita;* not yet quite full moon, *ahandu laläli;* full moon, *djulum läaläli;* last crescent, *ahandu alulăna;* new moon, *ikona.* Of these *ahandu laläli* denotes a phase between half and full moon: 'there are two moons'. Probably the bright and the dark moon are meant. This was confirmed for other Indians, but without its being possible to obtain any accurate account, says our authority. The theory however fits badly, since the earth-light disappears in the second quarter, but is very prominent in the first. The people however were themselves not clear as to the succession of the phases, they gave different orders and often corrected themselves [3].

The Hottentots call the just emerging, hardly yet perceptible crescent by a name which means 'unripe' and is also used to denote a premature fruit. The slender shining crescent, in which the moon as it were 'revives', is called by a name with that significance. The first two quarters have two names common to both of them, 'the moon which becomes great or old', and 'the moon which becomes wise'. In the last quarter only the slender crescent is distinguished: it is called 'the dying moon' [4]. In exceptional cases no name for the full moon is

[1] Reed, p. 64. [2] Hambruch, p. 57. [3] Krause, p. 339. [4] Schulze, p. 370.

given, but we can hardly conclude that such a name was wanting. An Australian tribe of the North Territory calls the full moon *igul,* the half-moon *idadad,* and the crescent of the new moon *wurdu* [1]. The terminology in Central Australia is far richer: — *atninja quirka utnamma* = new moon, *a. q. iwuminta* = half-moon, *a. urterurtera* = three-quarter moon, *a. aluquirta* = full moon [2]. No terms whatever are given for the waning moon, but that they were entirely lacking is doubtful, though it is also to be doubted whether terms for the half and three-quarter moon cannot also be applied to the waning moon. It should be noted that in Central Australia, as the words shew, the new and the full moon are the original phases.

The observation and naming of the phases of the moon long remain quite unsystematic. The names are mingled with terms arising from other circumstances. Of the Thonga of S. E. Africa it is reported: — When the first quarter appears, the moon is said to *thwasa,* a Zulu word which corresponds to *tjhama* in Thonga, and is very much used in the terminology of possessions. Eight days later it is said to *basa,* to be white or brilliant; full moon is said to *sima* or *lata batjongwana,* to put the little children to bed, because when it rises it finds them already sleeping on their mats. The wane is called *kushwela dambo,* the moon is then found by the rising sun to be still in the sky, not having yet dipped below the horizon. When at last it disappears, it is *munyama,* the obscurity, the moon is said to *fa,* to have died [3]. The position of the moon in the sky is also taken into consideration, but not to such an extent as among the Ewe tribes [4]; the latter however are also acquainted with another terminology. Full moon is called 'the moon fits', i. e. nothing of it is wanting, new moon 'the moon is dead'. In the first quarter and at the half-moon they say: 'the moon is half round' or 'falls upon the wood', i. e. stands low on the horizon; shortly before full moon 'the moon is about to become complete', 'is on the increase'; after the full moon 'the moon is about to wane'; three days after full moon 'the moon has cheated some people', since it leaves in the lurch those who wish to

[1] Spencer, p. 333. [2] Spencer and Gillen, *Centr. Austr.,* p. 565. [3] Junod, *Thonga,* II, 283. [4] Cp. above, p. 150

play in the evening; in the last quarter 'the moon is like the tail of the cock' or 'sleeps in the open', since it stands in the sky at day-break [1]. For the pagan races of the Malay Peninsula words are given for the new moon, the crescent of the moon, the half-moon, the end of the waning moon, no moon [2]. The Bontoc Igorot of Luzon describe three phases between full moon and the waning moon, and three between new moon and full moon, eight altogether therefore, and have special names for them, but rarely make use of them in time-reckoning [3]. The Nabaloi have other words for the same phases, and also one for the moon showing a rim of light [4]. The natives of New Britain (Bismarck Archipelago) observed the phases of the moon *(kalang),* and had separate terms for them, e. g. 'moon not visible', 'first quarter of the moon *(sic!)*', 'nearly full moon' (in which they hunted for the land-crabs), full moon, 'beginning to wane', 'moon when seen in the morning', etc. They also measured time between sunset and moon-rise by the 'smouldering of a torch', the time occupied in cooking yams, taro, and wild taro [5]. In Buin the crescent as it becomes visible is first called *rubu,* 'the pupil (of the eye) is dead', since the whole moon is often to be seen as a dark disc when the crescent is first formed. Later they say *motoguba,* 'a hook is made'. Still later, *nobele,* 'a piece', 'a bit'. When the moon's disc is full, *mairen,* 'it is ripe' or 'old', and *roukeu,* 'it is equal', i. e. full. When the moon begins to wane, it is called *ingom,* 'puffed out'. The 'puffing out' becomes weaker, and now the moon will die, *ekio buagi.* Throughout the period of the waning moon the expression used is *buan-gubio-eiraubi,* 'it is on the point of passing away to die'. During the period of the waxing moon they say *(ekio) duabegubi-eiraubi,* '(the moon) is about to pass away to the sun(light)-making'. During the time of new moon they say *mamarabui,* 'the great kobold is dead', or *ekio buaguro,* 'the moon is dead'. When it appears again they say *ekio ruku,* 'the moon again makes pupils', i. e. is in the sky. From the appearance of the moon until the time of new moon they reckon 25 days. The number however is not always the same,

[1] Spieth, p. 556. [2] Skeat and Blagden, II, 660. [3] Jenks, p. 219. [4] Scheerer, p. 158. [5] Brown, p. 332.

but is variously given as 30—31 days or sometimes as only 15. It must be supposed that thick clouds often hinder the observation. The natives count from the rising of the moon [1]. Of the tribes of the Torres Straits we are told: — In Mabuiag the following descriptions of the phases of the moon are used: *dang mulpal,* 'tooth-moon', since the crescent at its first appearance is described as unmarried: a little later the moon is called *kisai,* and termed young. The half moon is *ipi laig,* 'married person'; the moon in the third quarter is described as *kazi laig,* 'person with child', and is regarded as having one child, i. e. presumably as being pregnant; the full moon is *badi,* which is said to mean 'big one married'. In Mer the crescent of the moon when first observed was called *aketi meb,* the moon in the first quarter was *meb digemli,* in the third *meb zizimi,* almost full *eip meb,* and full moon *giz meb* [2].

Among the tribes of Central Brazil (the Bakairi), as also elsewhere, the phases of the moon have found mythological expression. The moon is represented as a shuttle-cock; the phases start from the full moon. First a lizard comes and takes hold of it, on the second day an armadillo, and then a Giant armadillo, whose thick body soon quite covers the yellow feathers [3]. The phases are similarly explained among the Paressi [4].

In regard to the more accurate determination of the days of the moon-month up to the point when each day has its separate name, it is possible to proceed in two ways, either to develop more and more elaborately the concrete descriptions from the phases and positions of the moon, until every day thus takes its name from the shape or the position of the moon, or else simply to number the days. The simple counting and numbering of all the days of the month from the new moon up to 29 or 30 is the most abstract method, and it is only found among the most highly developed peoples. Commonly a mixed system obtains, such, for instance, as that of the Romans, so that within the month, from the starting-points offered by the phases, the days of a certain smaller division

[1] Thurnwald, pp. 330 ff. [2] Ray, in *R. T. Str.,* p. 225. [3] von den Steinen, p. 358. [4] *Ibid.,* p. 435.

are counted, or a short phase is distinguished by means of adjectives in the first, the second, and even the third day of the phase.

The following may serve as an example of a purely concrete system. Among the Mendalam Kayan of Borneo the different days of the period of the moon's visibility have the following names in the Busang language (the common commercial tongue of the Bukau): — *njina* (see) *dang* (pretty well); *matau* (eye) *dang; lekurdang; butit* (belly) *halab* (tetrodon, a trunk-fish) *ok* (little); *butit halab aja* (big); *keleong* (body) *paja ok; keleong paja aja; beleling* (edge) *dija;* and *kamat* (full moon). The days following have the same names, but in the inverse order, and with the addition of *uli,* i. e. to go home. The days of the moon's invisibility are not reckoned [1]. The days mentioned amount to only 2×8; others must therefore be lacking, or do the names given apply to moon-phases of more than one day's duration? The author's wording seems to contradict this. The Batak of Sumatra describe the days by the names of the planets (borrowed from the Sanskrit), repeated four times. To distinguish one from another they make use of additions some of which may probably be referred to original Batak terms [2]. A complete system exists among the Toradja of the Dutch East Indies, in connexion with a fully developed day-superstition such as so often accompanies the moon-month. On certain days, here distinguished by an asterisk, it is forbidden to work in the fields: other work is however permitted. *1, *eo mboeja,* 'day of the moon', from the evening on which the crescent of the moon was first seen. 2 to 9 have no special names: they are called altogether *oeajoeeo,* 'the eight days'; the people count *ka'isanja oeajoe,* 'the first of the eight', or *oejoeënja,* 'the beginner', then the second, the third, etc., and so on up to *kapoesanja oeajoe,* 'the end of the eight'. 10, *woeja mbawoe kodi,* 'the little pig moon'. *11, *woeja mbawoe bangke,* 'the great pig moon'; there is a danger that the pigs may break into the fields. *12, *taoe koi,* 13, *taoe bangke,* 'the little' and 'the great man moon'; 14, *kakoenia,* from *koeni,* 'yellow' (among the To Pebato *sompe,* 'lying', i. e. on the horizon). *15, *togin*

[1] Nieuwenhuis, I, 317. [2] Adriani, quoted by Winkler, p. 440.

enggeri, from *gengge,* 'to run to and fro' (of animals seeking food), i. e. one is annoyed by those who run to and fro. *16, *pombarani,* 'the burner', since the moon in the morning shines on the house-door; or more rarely *pombontje.* 17 to 20, *wani,* 'dark'. 21, *merontjo,* among the To Pebato *wani of kapoesa mbani,* the last dark day. *22, *kawe,* 'to wink', 23—25, the second, third, and last *kawe.* *26, *toe'a marate,* 'the long tree-trunk' (trunk of a felled tree). 27, *toe'a rede,* 'the short stump', in the east *ojonja saeo,* 'with a day in between', i. e. until the vanishing of the moon. 28, *polioenja,* 'passing', i. e. the moon goes past the sun. 29, *soea,* 'going inside', 'inside', because the moon is then completely inside. Every second month has 30 days; the *30th is called *soea ma'i,* the *soea* 'on this side', the second *soea.* The days are named from the position of the moon at sunrise, since only the agricultural day is of any importance [1].

In Micro- and Polynesia this kind of terminology is best developed. In Samoa the period of the new moon has few names; the new moon is called *masina pupula,* the nights after this — when a little of the moon is once more visible — *mu'a mu'a.* On the other hand the days up to and after the full moon have separate names, and are of importance on account of the palolo, which is then eagerly sought after. Full moon, *masina 'atoa,* 'full'; 1, night after full moon, *masina le'ale'a;* 2, *masina fe'etelele;* 3, *masina atatai,* the sea sparkles at the rising; 4, *fana'ele'ele,* according to Stair 'paling tide'; 5, *sulutele,* the *mali'o*-crab is caught with torches *(sulu),* according to Stair *poolesa,* night of the *lesa;* 6, *masina mauna,* according to Stair *popololoa,* 'long nights'; 7, *masina mauna;* 8 (the first palolo-day), *usunoa,* 'wandering about aimlessly', also called *salefu,* since foam *(lefu)* appears as the first sign of the palolo; 9, *masina motusaga* (second palolo-day), *motu* 'fragile', *saga* 'continuing'; 10, *tatelego,* great palolo-day, which may also begin on the 9th, *ta* = to fish; 11 (new moon), *masina punifaga,* 'only a little covered'; 12, *masina tafaleu,* 'little cut away'; 13, *masina tafaleu.* The crescent shortly before new moon is called *masina fa'atoaoina* [2].

[1] Adriani and Kruijt, II, 264 ff. [2] von Krämer, I, 356 ff.

In Hawaii the system was very elaborately developed. The month had thirty days; 17 of these had compound names *(inoa huhui)*, and 13 had simple names (*inoa pakahi*). These names were given to the different nights to correspond with the phases of the moon. There were three phases — *ano* —, marking the moon's increase and decrease of size, (1) the first appearance of the new moon in the west at evening, (2) the time of full moon when it stood directly overhead (lit. over the island) at midnight, (3) the period when the moon was waning, when it shewed itself in the east late at night. It was with reference to these three phases of the moon that names were given to the nights that made up the month [1]. In former times there is said to have been a division of the month into periods of ten days, corresponding to the increase, the full, and the decline of the moon [2]. The names of the nights were: — 1, *hilo,* 'to twist', because the part then seen was a mere thread; 2, *hoaka,* 'crescent'; 3, *kukahi;* 4, *kulua;* 5, *kukolu;* 6, *kupua;* 7, *olekukahi;* 8, *olekulua;* 9, *olekukolu;* 10, *olekupau.* When the sharp points were lost in the moon's first quarter, the name of that night was 11, *huna,* 'to conceal'; the next, on its becoming gibbous, was 12, *mohalu;* 13, *hua,* 'egg'; and when its roundness was quite obvious, 14, *akua,* 'God'. The nights in which the moon was full or nearly so were: — 15, *hoku;* 16, *marealau;* 17, *kolu.* The night in which the moon's decrease became perceptible was called 18, *laaukukahi.* As it continued to diminish the nights were called: — 19, *olaaukulua;* 20, *laaupau;* 21, *olekukahi;* 22, *olekulua;* 23, *olepau;* 24, *kaloakukahi;* 25, *kaloakulua;* 26, *kaloapau;* when the moon was very small, 27, *mauli;* the night in which it disappeared, 28, *muku.* This is Dibble's list (pp. 24 ff.). Fornander (p. 126) counts in the same way up to 26, *kaloapau,* and then continues, 27, *kaue;* 28, *lono;* 29, *mauli;* 30, *muku.* Malo gives the same names as Dibble, with the following additions: — The 15th night had two names. If the moon set before daylight it was called *hoku palemo,* 'sinking star', but if, when daylight came, it was still above the horizon, it was called *hoku ili,* 'stranded star'. The second of the nights in which the moon did not set until after sunrise

[1] Malo, pp. 54 ff. [2] Fornander, I, 120 ff.

(the 16th) was called *mahealaui.* When the moon's rising was delayed until after the darkness had set in, it was called 17, *kulua,* and the second of the nights in which the moon made its appearance after dark was 18, *laau-ku-kahi;* the moon had now waned so much as again to shew sharp horns. The night when the moon rose at dawn of day was *kane* (the 27th), and the following night, in which the moon rose only as the day was breaking, *lono* (the 28th). When the moon delayed its rising until daylight had come, it was called *mauli* (the 29th), 'fainting', and when its rising was so late that it could no longer be seen for the light of the sun, it was called *muku* (the 30th), 'cut off'. Thus were accomplished the thirty days and nights of the month. A bare list of the thirty names of the days is given for the Marquesas [1]. Alongside of these a bipartite division of the month is mentioned — the moon arriving, and the moon about to be extinguished [2]. In New Zealand there are various lists of the nights of the moon. The month is also sometimes divided into halves according to the waxing and waning moon [3].

I give the Tahitian names in order to point out that here, as also in Hawaii, some days in the middle of both halves of the month have the same names, which are distinguished from the next following by additions the sense of which is unfortunately not always given. Thus: — 1, *tirreo;* 2, *tirrohiddi;* 3, *o-hatta;* 4, *ammi-amma;* 5, *ammi-amma-hoi;* 6, *orre-orre;* 7, *orre-orre-hoi;* 8, *tamatea;* 9, *huna;* 10, *orabu;* 11, *maharru;* 12, *ohua*; 13, *mahiddu;* 14, *ohoddu;* 15, *marai;* 16, *oturu;* 17, *ra-au;* 18, *ra-au-hoi;* 19, *ra-au-haddi;* 20, *ororo-tai;* 21, *ororo-rotto;* 22, *ororo-haddi;* 23, *tarroa-tahai;* 24, *tarroa-rotto;* 25, *tarroa-haddi;* 26, *tane;* 27, *oro-mua;* 28, *oro-muri;* 29, *omuddu* (28 and 29 together *matte-marama,* on the Society Islands they say during these days that the moon is dead) [4]. In the islands just mentioned the names of three successive days are often formed from *mua,* 'fore', *roto,* 'in the middle', and *muri,* 'hinder' [5], and in the

[1] Fornander, p. 126. [2] Mathias G., p. 211. [3] Treager, *JRAI, 19,* p. 114. [4] Forster, pp. 439 ff.; cp. Treagear, *Maori Dictionary,* App. A. [5] The names of the days (Ellis, *Polyn. Res.*[3], I, 88) are very similar to those of Tahiti; cp. also Wegener, p. 147, n. 1.

Carolines names of the days are similarly combined in groups. From these lists it becomes plain how the names of the separate days have been first worked out from the phases of the moon. When only 29 names are given, the thirtieth day occurring only in every other month has evidently been left out. This must be the case, because the month always begins with the new moon. We further possess lists of the days of the month for the Mortlock Islands, and some for the Carolines, Ponape, Yap, Uleai, Lamotrek [1]; the lists for Lamotrek, Uleai, and the Mortlock Islands differ only in the dialect. It is to be noted that in some cases the month falls into smaller subdivisions, as in Ponape, where it begins after the full moon and consists of three periods: — 1, *rot,* 'darkness', i. e. nights when there is no moon, 13 days; 2, *mach,* new moon, 9 days, which are numbered consecutively; 3, *pul,* the time of full moon, 5 days. Three days are therefore lacking (the time of invisibility?). In Yap 1, *pul,* new moon, 13 days; 2, *botrau,* full moon, 9 days; 3, *lumor,* 'darkness', 8 days.

The very fully developed system of the Nandi is curious in that not the phase but the time of the moon's rising chiefly gives the name of the day. 1, 'the tanners have seen the moon'; 2, 'the moon is white' or 'new'; 3 and 4, 'the moon has cast a light'; 5 and 6, 'the moon has become warm'; 7 and 8, 'the moon has leisure'; 9 and 10, 'the herdsmen play in the moonlight'; 11 and 12,' the moon is high in the evening'; 13, 'the moon turns'; 14, 'the moon has accompanied the goats to the kraal' [2]; 16 (full moon), 'the moon has passed along (the heavens)'; 17, (morning) 'the birds have driven away the moon', (evening) 'the moon has disappeared for a short while'; 18, 'the moon has commenced to rise late'; 19 to 21, 'the moon is late'; 22, 'the moon has climbed up' (i. e. stands high in the heavens in the morning); 23 to 25, 'the moon is late up above'; 26 and 27, 'the moon has turned' (i. e. goes towards the west); 28, 'the moon is nearing death'; 29, 'the people discuss the moon' (discuss whether it is dead), or 'the

[1] Collected by Christians, pp. 387 ff. [2] These expressions give the time of day, cp. above, p. 150.

sun has murdered the moon'; 30, 'the moon is dead', or 'the moon's darkness' [1].

An example of the naming of smaller groups of days after the phases of the moon is afforded by the old Arabian names for the nights of the month [2]. The nights are grouped in threes, and are called: — 1—3, *ghurar,* 'the bright ones'; 4—6, *nufal,* 'the overlapping nights' (?); 7—9, *tusa',* 'the nine'; 10—12, *'ushar,* 'the ten'; 13—15, 'the white nights', lit. *'ajjam al-lajāli l-bidi,* 'the days of the white nights', the time of full moon; 16—18, *dura',* 'the white nights with black heads', since the moon does not rise until the night; 19—21, *zulam,* 'the dark nights'; 22—24, *hanadis* or *ḏuhm,* 'the very dark nights'; 25—27, *da'ādī',* perhaps after *mihaq;* 28—30, *mihaq,* from *mhq,* 'to extinguish'. The time of the moon's invisibility, *mihaq,* consists of the following days: — 1, *ad-da'dja,* 'the black one'; 2, *as-sirār,* from *srr,* 'to be hidden'; 3, *al-falta,* 'sudden event', 'attack'. According to some this last name is used only on the night before, according to others after, a holy month. This looks like an attempt to regulate the insertion of the 30th day.

Hitherto we have observed the division of the month into small and the smallest phases of the moon, in which three or at most four days have the same name, and are numbered in order that they may be distinguished. Other peoples count the days beginning at the principal moon-phases. The Central Eskimos can determine the days of the month very accurately from the age of the moon [3], the terms are unfortunately not given. So also for the Kaigan of N. W. America names of the nights reckoned from the phases of the moon are quoted; unfortunately only very confused and inaccurate information could be obtained, and only 14 names are given: — 1, new moon; 2, 'second sleep', etc., up to 9, full moon or 'great moon', the third night after which is 'the first night after the full moon' [4]. For the inhabitants of southern Formosa the bare and therefore almost useless statement is made that they reckon according to the age of the moon [5]. Of the Wagogo of what was formerly German East Africa we are

[1] Hollis, *Nandi,* pp. 95 ff. [2] Ginzel, I, 243. [3] Boas, p. 648. [4] Radloff, p. 308. [5] Wirth, p. 364.

told that the phases of the moon and the numbers of the nights serve as more accurate determinations of time. For instance, the third night after the next appearance of the moon will be the day following the third night after the moon's appearance, and therefore the fourth of a month, since the crescent is visible exactly on the first day of a month [1]. Unfortunately we are not told what phases, other than the new moon, serve as starting-points for the reckoning. The same remark applies to an account for Sumatra. The Central Sumatran Expedition has proved that names for days of the week and for months are unknown among the Rawa and the Djambi Kubu of Djipati Mando. The people count by the phases of the moon, and say e. g. the 1st, 2nd, 3rd day of the moon [2].

These accounts are unfortunately of little use, since they say too little about the method of the counting. Even when a complete list of the days or nights of the month does seem to be forthcoming (the Wagogo, the Kubu), it generally happens that the counting proceeds from several starting-points, so that the month is divided up into smaller divisions. This is natural, since primitive peoples not only possess small capacity for counting but also prefer to keep the concrete phenomenon in view. It has already been pointed out that the counting frequently begins at the two most prominent phases, the new and the full moon; by this means the month is divided into the two corresponding halves of the waxing and the waning moon, or in respect of the appearance or non-appearance of the moon in the evening and early night into the light and the dark halves. The difference between these halves follows from direct observation of nature, and they are therefore known even to peoples which do not count the days, e. g. the inhabitants of Buin [3], the Germanic tribes, and others. In Swedish the distinction between *ny* and *nedan*, i. e. the time of the waxing and of the waning moon, is still known. The Masai, besides a full list of the days of the month, have a second reckoning according to the light and the dark halves

[1] Claus, p. 38. [2] Hagen, pp. 154 ff. [3] Above, p. 158.

of the month [1]. The Hindus and the civilised peoples of S. E. Asia reckon in the same way: of these systems of time-reckoning the Hindu has exercised a powerful influence. Avesta shews the same reckoning. In the old Gallic calendar of Coligny each month is divided into two sharply distinguished halves. The Romans indeed, in the form of their calendar known to us, reckoned so many days before the Kalends (the first day of the month), the Nones (the 5th or 7th), and the Ides (the 13th or 15th), but before their calendar settled into its curious and quite irrational historic form the *Kalendae* must have been the day of the new moon, which was publicly proclaimed, and the *Idus* the day of full moon. The *Nonae* are secondary: the word simply means the ninth (day), i. e. before the Ides, which position the day occupies in the inclusive reckoning employed. The Greek reckoning in decades is well-known, but in earlier times a bipartite division of the month appears. Homer divides the month into *ἱστάμενος* and *φθίνων* ('rising' and 'fading'), Hesiod once mentions a 'thirteenth day of the rising moon' [2].

We have seen above how to the phases of the new and the full moon that of the waning moon is added as a third. When the gradual development of the moon is regarded — as is done when numbers are used — and not the particular shape of it appearing on a certain day, we also get three periods, since between the waxing and the waning occurs the full moon, and this, although not in the strictest sense, lasts longer than a day, and unlike the waxing and the waning moon remains in the sky the whole night long. The time of full moon therefore appears as a third independent period between the waxing and the waning. The impulse to a tripartite division hereby given clashed with the decimal system of enumeration of most peoples; as a rule the counting was suspended at the basal series of numbers. In this manner we may account for the not uncommon phenomenon that only ten months are numbered, the two others being called by special

[1] Merker, p. 156, n. 1. [2] The twice-recurring verse *τοῦ μὲν φθίνοντος μηνὸς τοῦ δ' ἱσταμένοιο* in Homer, *Od.* XIV, 162 and XIX, 307; Hesiod, *Op.*, v. 780. Cp. my *Entstehung*, pp. 27 and 30 f.

names [1]. Thus arises the division of the month into three decades, in which however the last decade may vary between 9 and 10 days.

The division into decades is not so common as the halving of the month. The Zuñi of Arizona divide the month into three decades, each of which is called a 'ten' [2]. The Ahanta of the western Gold Coast divide the moon-month into three periods, two of ten days each, the third — which lasts until the new moon appears — of about 9 1/2 days (more correctly, no doubt, varying between 9 and 10 days.) The Sofalese of East Africa must have done the same, since de Faria says that they divided the month into 3 decades and that the first day of the first decade was the feast of the new moon [3]. The Masai, who number either the days of the whole month consecutively or the days of its two halves, nevertheless give special prominence to the initial days of the decades (alongside of other notable days), and call them *negera* [4].

Among the Greeks the division into decades displaced the older bisection. Of the names of the decades the first and third refer to the concrete form of the moon: *μὴν ἱστάμενος*, older *δεξόμενος* [5], literally 'the appearing, waxing moon', and *μὴν φθίνων*, 'the waning moon'. For originally *μήν* must here have had the sense of 'moon' which the etymology suggests. The second decade was called *μὴν μεσῶν*, 'the month at the middle': the epithet shews that *μήν* here means 'month', and not 'moon'. This name is therefore younger than the two others, which must once have been used to describe the two halves of the month, and do so still in Homer [6].

The custom of reckoning on the fingers or on a notched stick has doubtless lent assistance to the counting of the days of the month. The Wa-Sania make a notch in a stick for every day, and when the month is ended they put this stick aside and begin a new one [7]. At the southern corner of Lake Nyassa the days are counted by means of pieces of wood threaded on a string [8]. A complete enumeration of the days however

[1] Below, pp. 188 and 206 f. [2] Stevenson, p. 108. [3] Ellis, *Yoruba*, p. 144. [4] Merker, pp. 154 ff. [5] Hesiod, *Op.*, v. 773. [6] See my remarks in *Arch. f. Religionswiss.*, *14*, p. 432. [7] Barrett, p. 35. [8] Stannus, p. 288.

only exists among highly developed peoples who have discarded a more concrete time-reckoning in favour of an abstract system, just as the civilised peoples of modern Europe abandoned the Roman system of time-reckoning, which was still often used in the Middle Ages (though indeed it had long since departed from its concrete basis), in favour of a simple enumeration of the days of the month.

Finally a couple of curious East African reckonings of the days of the month are to be mentioned, although they are not primitive but have a lengthy development behind them. A common feature of both is that the day of the new moon is already the fourth day, so that the counting of the days begins with the moon's invisibility, which can hardly have been the original practice. The Wadschagga divide the month into four parts the days of which are numbered, the first and third parts consisting of ten days each, and the second and fourth of five days each. Accordingly they begin to count the new moon at 'the fourth day, which brings the moon', the day on which the slender delicate crescent of the moon first reappears after sunset: for the rites of this day see above, p. 153. On the fourth day of the second division (the eleventh after new moon) they say that 'the moon turns to the back of the house': when twilight falls it is already seen beyond the culmination-point. The fourth day of the third division (the 16th after new moon) is called 'the day that brings the moon up from below' (i. e. from the eastern horizon), where 'it appears like a pot'; the fourth day of the last division is called 'the four, which dismisses the moon', and the first of the first division, when the moon vanishes, 'the one, which floats away the moon so that it is no longer visible': it 'tramples into pieces the days of the God' [1]. The natural phases of the moon therefore make themselves felt in spite of the counting. With this, as is so often the case, is connected a fully developed superstition concerning the days of the month. The Masai in ordinary life reckon their moon-months as consisting of 30 days, and number the days from 1 to 30 or

[1] Gutmann, pp. 238 ff.

29. Besides this there is a second way of counting which begins at the 16th and reckons the days of darkness *(en aimen)*. Further, special prominence is given to certain days and groups of days, e. g. to the 4th, the new-moon day, hence called also *ertaduage duo olaba,* 'the moon is to be seen', to the 15th, *ol gadet,* i. e. the rising moon 'looks over' to the sun which has not yet set, and to the concluding day, the *eng ebor olaba,* 'the brightness of the moon', but especially to the days of the dark half of the month, *en aimen.* The 16th is called *ol onjori,* 'the greenish day', the 17th, *ol onjugi,* 'the red', 18 to 20, *es sobiaïn,* 21 to 23, *nigeïn,* 27 etc., *en aimen nerok,* 'the black darkness'. The people also emphasise the concluding days of the decades [1]. The natural foundation afforded by the phases of the moon therefore appears very clearly: the only noteworthy feature is that the days of the moon's invisibility are included in the division which is called 'the brightness of the moon'. An outside influence must no doubt be assumed. Among the Masai also the selection of lucky and unlucky days is common.

The starting-points in the counting of the days of the month also afford evidence for the question as to which phases of the moon are the oldest, and were already utilised for this purpose. Both the methods of counting and the phases themselves are based upon a bisection or trisection of the month: to this were then added other phases, originally quite unsystematically. Among us the quarters of the moon are common; but of their use among primitive peoples I have found only a single instance. Of the Papuans of the Indian Archipelago it is stated that they divide the month into four parts according to the phases of the moon: *païk baleo,* the new moon, *païk jouwar,* the first quarter, *païk plejif,* the waning of the moon, and *païk imar,* the old moon [2]. It must not, of course, be taken for granted that these phases are of equal length, as ours are.

That the quadripartite division of the month should be practically non-existent among primitive peoples is easily to be un-

[1] Merker, pp. 154 ff. [2] De Backer, p. 407; for the Andamanese cp. above p. 155.

derstood in view of the considerations already mentioned. Unlike the halving it is not based upon any very clearly distinguishable phases, nor is there in the phases any such suggestion of a quadripartite division as is offered for a tripartite. The shape of the moon on the 8th or the 22nd day differs very little from that of the previous and the following days, and does not constitute a turning-point like the full moon. From the phases of the moon no quadripartite division can arise: the brightest phase of all, the full moon, has an unnatural position in such a division. It can only be understood as a halving of the halves of the month, and this presupposes that the moon's variation in light is regarded as a unity and divided into parts. The primitive peoples however start not with the abstract unity but with the concrete phases, proceeding at first quite unsystematically, and only subsequently combining them into a system. The quadripartite division therefore is in its very nature a numerical system. That it has penetrated so profoundly into our natures that even ethnological scholars and travellers are not always able to get away from it, is due to the connexion with the seven-day week, which is regarded as a division of the month, and also to the fact that we so seldom take any notice of the concrete phenomena of the heavens.

The quadripartite division must therefore be described as not original (the case is different when the time of the moon's invisibility is added as a fourth phase to the three already mentioned). To the best of my knowledge it appears first in Babylonia [1], and gains ground together with the *sabattu*, i. e. the appointing of every seventh day of the month as tabooed: it has become common among us on account of the seven-day week, which was conceived as a division of the month. In reality the tripartite division is also the natural one, since it arises from the concrete phenomenon of the moon, and not from any division of the month into parts consisting of a cer-

[1] See the passage from a Babylonian Creation epic quoted by Boll in Pauly-Wissowa's *Realcykl. der klass. Altertumswiss.*, VII, 2551.

tain number of days. Here the full moon takes its proper place, which it misses in the quadripartite division. The limitation of the divisions to a definite number of days is secondary throughout.

CHAPTER VI.

THE MONTHS.

The (moon-)month has originally nothing to do with the year and the seasons: this must be clearly and definitely recognised. The months may be reckoned independently of the year; nothing hinders us from counting up to twenty or a hundred months. But most peoples, before they have developed a definite system of time-reckoning, can count no farther than ten at most, and in the time-reckoning the counting is of course always the latest and most abstract stage. Such an enumeration of the months may commence at any point of the year and be continued *ad libitum;* in relation to the year it is not fixed but shifting. Both series, the years and the months, are enumerated without reference to one another, as our days of the week in relation to the year, the days of the week falling on different dates in different years.

The month however is a shorter period easy to survey, and such divisions are necessary in order to split up the too long period of the year. In itself the month has nothing to do with the year, nor does it exactly fit into the year ($12 \times 29\ ^1/_2$, about 355 days). It is impossible to combine the months with the year without doing violence to the one or the other. The time-reckoning of the modern civilised peoples has chosen this latter expedient. The month has become a conventional subdivision of the year; it is quite independent of the moon, and keeps as reminders of its origin only its name and a length approximating to that of the moon's revolution. This has come about because the moon, unlike the sun and the seasons depending thereon, has no immediate influence upon the events and occupations of our lives. We have therefore come back

from the reckoning in moons to the purely solar year. It was quite otherwise with the primitive peoples, whose time-reckoning was so concrete. For them the moon afforded the only fixed measure of the duration of time: its appearance impressed itself firmly upon the mind. These peoples therefore, even at an advanced stage of development, have tried to adjust the year by the moon, which could only be done by adopting years of varying length, of 12 and 13 months respectively. How this lunisolar reckoning has arisen, it will be the object of the following chapters to investigate. I begin by setting forth the somewhat copious material for series of months.

For the peoples of North Asia I have hitherto been able to make hardly any statements: the works are for the most part written in Russian, and are for that reason inaccessible to me. For the names of months, however, abundant material is accessible.

The names given to the months by the Voguls, with variants from the districts of Tawda, Konda, and middle and lower Loswa (tributary of the Irtysh), are, beginning from Sept./Oct.: — 1, little autumn-hunting month, little autumn, autumn month; 2, great autumn-hunting month, month of the naked trees, snow month; 3, winter month; 4, month of light (lengthening of the days), winter month; 5, ski month, the little winter month, wind month; 6, month of the thawing snow-crust; 7, month of thaw, spawning month or month of corn-sowing; 8, sap-in-firs month, ploughing month; 9, sap-in-birches month; 10, middle-of-summer month; 11, month of the young razor-bills, month of young water-fowl; 12, elk-running month. According to Ahlqvist the midsummer month is distinguished as greater or smaller. There must therefore, as is so often the case, be 13 months. Three months, nos. 7, 9, and 11, seem to have no special names in the Tawda district, but this is not very surprising [1].

Schiefner in particular has collected extremely full and detailed lists of the names of the months among the various races of Siberia. These lists I here reproduce.

[1] Mausser, p. 222.

The Tchuvashes have the following thirteen months: — 1, thank-offering month, beginning in the middle of November; 2, very steep month; 3, month of little steepness; 4, spring month; 5, free month; 6, sowing month; 7, summer month; 8, the maidens' month; 9, hay month; 10, sickle month; 11, flax month; 12, threshing-floor. month; 13, grave-post month. The maidens' month, which is said to owe its name to the custom of celebrating marriages at that time, is also called 'fallow-land month'; the 'free' month is so called because in it no work is done in the fields; the 'grave-post' month takes its name from the feast of the dead, which is then celebrated on the graves, with gifts of every kind.

The Ugric Ostiaks have 13 months: — 1, spawning month, about April; 2, pine sap-wood month; 3, birch sap-wood month; 4, salmon-weir month; 5, month of hay-harvest; 6, ducks-and-geese-go-away month; 7, naked tree month (falling of the leaves); 8, pedestrian month, since men go home on foot while the ice still remains; 9, month in which men go on horseback; 10, great, 11, little winter-ridge month; 12, wind month; 13, month of crows. Another list gives the following months: — 1, month in which the Obi dies (?), i. e. freezes; 2, month in which tribute is imposed; 3, month of the little snow-crust, or first spring month; 4, month of the great snow-crust; 5, month of the unstable ice; 6, month when the syrok (a kind of salmon) comes; 7, middle-of-summer month; 8, cloudberry month; 9, month in which the track (the road) of the Obi freezes, or first autumn month; 10, month in which the Obi freezes; 11, month of the short days or of the deceptive feet or of the dog's feet; 12, month in which the tribute is levied — only twelve months, therefore, but the list shews many variants and does not seem to be in its right order, compare e. g. months 1 and 10, referring to the same natural phenomenon, which in the nature of things is impossible.

The Yeneseisk Ostiaks: — 1, summer month, about May; 2, not translated; 3, month when the ducks moult; 4, month when the garrot moults; 5, month in which the *njelma* is caught with great nets; 6, month in which the willow loses its foliage; 7, winter month; 8, month in which the earth

freezes; 9, reindeer-rutting month; 10, little month; 11, great month; 12, eagle month; 13, squirrel month, in which the striped squirrel comes out of its nest. The Yeneseisk Ostiaks of the Sym are said to count only seven winter months, not the summer months. They are: — 1, month in which the earth freezes; 2, reindeer-rutting month; 3, the little, 4, the great month; 5, eagle month; 6, squirrel month; 7, spawning month, in which the pike spawns. Another list gives: — 1, fall-of-the-leaf month; 2, month in which the earth begins to freeze; 3, dog month, in which the dogs pair; 4, the little, 5, the great month; 6, eagle month; 7, squirrel month; 8, spawning month; 9, month in which the Ostiaks set traps to catch sturgeon; 10, summer month, when the grass becomes green; 11, middle-of-summer month; 12, month in which the grass turns yellow, or month of the white grass-tips; 13, autumn month.

The Tatars of the Minusinsk district of the Yeneseisk government: — 1, the mild, easy month, or forest-month, since the people go hunting, about September; 2, little cold; 3, great cold; 4, the mottled month, bald patches of earth appear among the snow; 5, severe cold; 6, high, when the sun moves high above the horizon; 7, when the birds fly out in spring; 8, they (i. e. the days) increase; 9, the red month; 10, (perhaps) little drought; 11, birch-bark month, when birch-bark is collected; 12, grass month; 13, harvest month. There are also some variants which are not translated.

The Karagasses, who live next to the Minusinsk Tatars: — 1, 1/5—4/6, month of the low grass; 2, 4/6—2/7, birch-bark month, in which birch-bark is collected, this being used for the summer houses; 3, 2/7—30/7, month in which the lily-bulb is red, i. e. blossoms; 4, 30/7—27/8, month in which the lily-bulb is dug up; 5, 27/8—24/9, hammer month, when the cedar is tapped with the hammer in order to shake down the ripe cones with the nuts; 6, 24/9—22/10, reindeer-buck rutting month; 7, 22/10—19/11, sable month, when people begin to trap sables; 8, 19/11—17/12, month of the long rest, such as is taken during the short days; 9, 17/12—15/1, month of frost; 10, 15/1—12/2, great frost-month; 11, 12/2—12/3, snow-shoe

month, when over the deep but rotting snow deer and elks are hunted in snow-shoes; 12, 12/3—9/4, month when the snow becomes sticky; 13, 3/4—7/5, month in which people hunt with dogs; this is the time when, owing to the night-frosts, a crust forms on the snow, which is not strong enough to bear deer and elks. The dates given by the author can at most be applied only to one definite year.

The Buriats, from the new year: — 1, month in which the brooks freeze; 2, when the winter stores are seen to; 3, roe moon; 4, deer moon; 5, sheep moon; 6, when the ice breaks; 7, spring moon; 8, grass moon; 9, bulb moon; 10, milk moon; 11, milch? moon; 12, when after-math comes; 13, when it ripens; the first month is also called the white month. The Nishne-Udinsk Buriats: — 1, roe month, since in this month horns grow on the roe; 2, deer month, when the deer is caught; 3, ram month, when the sheep pair; 4, month of the red ridge of land, when the snow melts and the mountains become red; 5, fish-spawning month; 6, leek month; 7, the wild month, so called on account of the fierce heat; 8, roe month, when the roes pair; 9, deer month, when the deer pair; 10, squirrel month, since this animal is then caught; 11, the little sable month, sables are caught; 12, nest month, since the animals, on account of the cold, creep into their dens and nests. Only twelve months, therefore, as also among the Tunkinsk Buriats, for whom are translated only: — 1, the white month; 2, the red mountain-ridge; 5, the wild month; 11, roe month; 12, deer month.

The year of the Tunguses is divided into summer and winter. The names of the months are: — Summer: 1, *ilaga* (fly, gnat), in this the leaves and the early blossoms come out; 2, *ilkun,* is the proper flowering moon; 3, *irin* (from *irim,* to ripen), the wild fruit grows ripe; 4, *serula saunı* (perhaps *sonnaja,* cervical vertebra), in this month the red deer pair; 5, *hukterbi,* brings the red deer new hair. Winter: 1, *okti* (perhaps *okto,* road), when the first snow falls: immediately after that the minever is good; 2, *mira* (shoulder-joint), has the shortest days; 3, *giraun* (suggests *giramda,* bone), has days of noticeably increasing length; 4, *okton kira* (time of the road),

when the sables are covered; 5, *tura* (perhaps *turaki,* jackdaw), when the cormorants come; 6, *schonka,* when the ice becomes porous; 7, the beginning of the *tukun,* in which the rivers become clear: the last part of this period belongs to the summer year. Our informant, Georgi, speaks of thirteen months, but only gives the above twelve names. Schiefner conjectures that he has counted *tukun* twice, or else has run two months together. For the Tunguses of the Sea of Okhotsk only twelve months are enumerated, and of these are translated: — 1, grass month; 3, fish-and-horse month; 4, ripening month (?); 5, wrist; 6, elbow; 7, shoulder-joint; 8, atlas; nos. 5 to 11 are named from the joints of the human frame, 5—8 following out a suggestion of an ascending, 9—11 that of a descending order; the name of the twelfth month perhaps means the back. This is only one method of reckoning: a hint of it is already found in the preceding list. For the Tunguses of the lower Amur twelve months are reported, of which nos. 7—10 are simply numbered and the other names are not explained.

Another traveller could only discover eleven months among the Tunguses of the Amur, possibly only because of the defective memory of his informants. But a year of eleven months is said to exist among the Samoyedes of Yurak. The months are: — 1, month of leaf-fall, about August; 2, reindeer-rutting month; 3, the dark month; 4, sand month, when the winds drive the snow along like sand; 5, the calm month, no storms; 6, the good month, the weather is favourable for trapping animals; 7, eagle month; 8, geese month or month of calves; 9, month of inundations; 10, spring month, literally *wuenui-jiry, wuenui* is said of fish when they come up-stream in great shoals; 11, the great month, since the days (or the month) are very long.

The Ostiak Samoyedes have 12 months: — 1, leaf-fall month, about August; 2, month with the long days, or month when the earth freezes; 3, month of the short days; 4, tax month, month when the tax (i. e. the deer) is caught, or thumb month, since the women, on account of the shortness of the days, can make only the thumb of a glove; 5, mid-winter month;

6, month of crows, the crows come; 7, eagle month; 8, month in which the summer animals arrive; 9, month in which the fish spawn; 10, month in which there is water in the little brooks; 11, month in which fish are dried; 12, *njelma*-month. Another list of Samoyede months from the Bolshemelsk tundra runs, beginning at our New Year: — 1, middle month, or the cold breaks an axe, must doubtless be 'axe-handle month', the axe-handle splits with the cold; 2, month of return, when the sun has turned back to summer, or hornless month; 3, eagle month; 4, fish month, when people begin to fish in the lakes; 5, month of calves, in which the reindeer-does calve; 6, geese month, the geese begin to moult during the latter days of this month; 7, fledged month, the geese after moulting are again in a condition to use their wings; 8, maliz month, when the skins obtained from the reindeer are turned into malizes (an undergarment), or the reindeer rub the velvet off their horns; 9, reindeer-rutting month, or sea-fish month, from the catching of the *omulj;* 10, hunting month; 11, the first dark month, in which in the far north the sun does not rise; 12, the great month of darkness.

Further, the Yakuts have only twelve months: — 1, spawning month; 2, month of pines, the people collect pine-bark which is afterwards dried and ground into meal; 3, grass month; 4, hay-fork month, or the fourth month; 5 — 10 numbered; 11, the month in which the foals are shut up in the day-time and are kept from the mares, so that the latter can be milked; 12, month in which the ice floats away.

So also the Itälmen of Kamchatka: — Summer year, beginning in May: 1, wood-cock month, from the arrival of the wood-cock; 2, cuckoo month; 3, summer month; 4, moonlight month, since people begin to fish in the moonlight; 5, leaves and plants begin to wither and fall away; 6, titmouse month, the porus-titmouse appears. The winter year begins with: — 7, nettle month, the nettles are gathered and hung up to dry; 8, 'I am rather cold'; 9, 'touch me not': it is considered a crime to drink in this month from springs and brooks with the mouth or with hollow sticks: it must be done with great wooden spoons or with shells; 10, ladder month, the ladder leading to the balagans becomes very brittle owing to the cold; 11,

vent-hole month, since the snow around the vent-hole thaws and the earth again appears; 12, water-wagtail month, when these birds arrive. Two other lists for Kamchatka contain only ten months. Near the Kamchatka River the names are: — 1, sin-purifying month; 2, axe-handles break owing to the frost; 3, beginning of the heat *(sic!)*; 4, the day becomes long; 5, month of the snow-crust; 6, redfish month; 7, whitefish month; 8, *kaiko*-fish month; 9, the great whitefish month; 10, month of the falling leaves, said to last as long as three of our months. Among the northern Kamchadales the names are: — 1, month of the freezing of the rivers; 2, hunting month; 3, sin-purifying month; 4, axe-handles burst; 5, time of the long day; 6, birth-time of the sea-beavers; 7, birth-time of the seals; 8, birth-time of the tame reindeer; 9, birth-time of the wild reindeer; 10, beginning of the fishing. The winter year begins in November, the summer year in May.

For the Gilyaks two lists are given, each with twelve months. That for the Amur estuary has two or three variants for some months. The following are translated: — 1, month in which a kind of salmon spawns (?), or harpoon month (?); 2, month in which another species of salmon is caught; 3, little month; 4, great month, or month in which another kind of salmon is caught; 5, moulting-month; 6, half-year month (?); 8, year month; 9, eagle month; 10, snow-shovel month. On the island of Sachalin: — 3, fish-and-squirrel month; 4, little month; 5, great month; 10, eagle month; 11, snow-shovel month.

The Aino of the Kurile Islands: — 1, long days; 2, the snow melts; 3, coalmouse month; 4, sea-gull's eggs month; 5, guillemot's eggs month; 6, foddering month; 7, salmon-catching month; 8, month when the birds grow fat, or bird-snaring month; 9, the grass withers, or month when the grass is withered; 10, month of the short days; 11, winter month; 12, the-snow-fills-up.

The Aleuts begin the year in March: — 1, the foremost, or the time when people gnaw belts; 2, the period when people gnaw belts for the last time, or the time when one is out there (outside the house); 3, month of flowers; 4, young-of-animals month; 5, month when the young animals are fat; 6,

the warm month; 7, month in which hair grows, when the feathers and coats of animals grow thick; 8, hunting-month; 9, the month after hunting-month; 10, sea-lion month, when these animals are caught; 11, the great month, which is longer than any of the others; 12, cormorant month, when this bird is caught in nets.

Unfortunately the attention paid to these names has not been extended to the word which means 'month'. It would be valuable to know if the same word means 'moon': if so, it would be clearly proved that a moon-month is in question. Except in the lists for the Minusinsk Tatars and the Tunguses the names end with the same word, which is translated 'month', and in one case (the Buriats) 'moon', but this is doubtless a peculiarity due to the authority; however, isolated names are interspersed which have not this concluding word, as appears also from the above translations. The number of days indicated in the list pp. 176 f. suits only to moon-months. Upon the whole we are authorised in concluding that we have to do with genuine moon-months. This is expressly stated by American travellers, to whom we owe further information about the peoples of eastern Siberia.

The year of the Koryak, north of Kamchatka, is divided into twelve lunar months (called 'moons'). The first month begins at the time of the winter solstice and corresponds to our December. Some months have different names in different places, but the names of the months most commonly used are as follows: — 1, cold-winds month or snow-stormsmonth; 2, (growing-of-)the-reindeer's-spinal-sinew month; 3, false-making-udder month or reindeer-udder month[1]; 4, reindeer-does'-calving month; 5, water-month; 6, first summer-month; 7, second summer-month; 8, reddening (of leaves) month; 9, pairing-season-of-the-reindeer-bucks month or empty (bare)-twigs month; 10, autumn's month; 11, rutting-season-of-mountain-sheep month; 12, itself-head month or month-of-the-head-itself[2].

The Yukaghir names for their lunar months are given in translation: — 1 (July), the middle-of-the-summer month; 2, the

[1] Compare the corresponding Chukchee months cited by Bogoras, below p. 220. [2] Jochelson, *Koryak*, p. 428.

small mosquito month, because the mosquitoes appear; 3, the fish month, because fishing is then taking place for the winter stock; 4, the wild-reindeer buck month, the rutting-time of the wild reindeer; 5, the autumn month; 6, before-the-ridge month; 7, ridge month, i. e. the ridge of the spinal column — because in reckoning this month is denoted by the atlas, the first cervical vertebra —, or the great butterfly month; 8, the little butterfly month; here are meant the larvae of two species of gadfly which in summer lay their eggs, one in the skin of the reindeer, and the other in its nostril: during the winter the eggs develop into larvae; 9, name not translated; 10, the ancient men *cille* month: *cille* means the icy surface formed during the night on the snow, after having melted during the day: this commences in April; 11, leaf-month; 12, the mosquito month, because the mosquito makes its appearance then [1].

The same system recurs in North America. The Eskimos of the Behring Straits divide up the time according to the moon: by the 'moons' all time is reckoned during the year, and dates are set in advance for certain festivals and rites. Thirteen moons are reckoned to the year, although our authority could not always obtain complete series. The list is arranged according to our months: —1, 'to turn about', named from a game with a top; 2, time when the first seals are born; 3, time of creeping on game (refers to the seal-hunting on the ice); 4, time of cutting off, from the appearance of sharp lines of colour on the ptarmigan's body; 5, time for going in kayaks; 6, time for fawn-hunting; 7, the time when geese get new wing-feathers (moulting); 8, time for brooding geese to moult; 9, time for velvet-shedding (from horns of reindeer); 10, time for setting seal-nets; 11, time for bringing in winter stores; 12, time of the drum, the month when the winter festival begins. Very often several different names may be used to designate the same moon, if it should chance to be at a season when different occupations or notable occurrences in nature are observed: our authority has used the most common terms. For the lower Yukon delta, near Mission, the following list is drawn up: — 1, season for top-spin-

[1] Jochelson, *Yukaghir*, p. 41.

ning and running round the *kashim*; 2, time of offal-eating (scarcity of food), or the cold moon; 3, time of opening the upper passage-ways into the houses (this falls too early and is referred to an earlier, warmer time); 4, birds come; 5, geese come; 6, time of eggs; 7, time of salmon; 8, time for red salmon; 9, time for young geese to fly; 10, time for shedding velvet from reindeer-horns; 11, mush-ice forms; 12, time of musk-rats; 13, time of the feast. A third list was obtained just south of the Yukon delta: — 1, named from the game of the top; 2, the time of much moon, i. e. long nights; 3, the time of taking hares in nets; 4, the time of opening summer doors; 5, arrival of geese; 6, time of whitefish; 7, time of braining salmon; 8, geese moult; 9, swans moult; 10, the flying away (migration of the birds); 11, time of velvet-shedding; the names of the twelfth, and doubtless also of the thirteenth, month were not obtained [1].

The Central Eskimos divide the year into 13 months, the names of which vary very much according to the tribes and the latitude of the place. One month, *siringilang*, 'without sun' — the name covers the whole period of the year in which the sun does not rise — is of indeterminate length *(sic!)*, and thereby serves to equalise the length of the year. The name *qaumartenga* denotes only the days which are without sun but have twilight, the rest of this month is called *sirinektenga;* other names of months are not given [2]. The Eskimos of Greenland begin to count the moons at the winter solstice. After the third moon they remove from the winter houses into their summer tents. In the fourth they know that the little birds are again to be seen and that the ravens lay eggs, in the fifth the *angmasset* and the seals are once more to be seen with their young, at the end of this month the eider-ducks begin to brood and the reindeer-does to calve. From this time on, only those who live on latitude 59° can reckon by the moon any longer: the others count by the phenomena of natural life [3].

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[1] Nelson, pp. 234 ff. [2] Boas, *Eskimo*, pp. 644 ft. [3] Dalsager, pp. 54 ff; cp. Cranz, I, 293 ff.

The Konyag of the island of Kodiak off the southern coast of Alaska count from August the following months: — 1, the Pleiades begin to rise; 2, Orion rises; 3, hoar-frost covers the grass; 4, snow appears on the mountains; 5, the rivers and lakes freeze; 6, the sixth month; 7, dried fish is cut in pieces; 8, the ice breaks; 9, the ravens lay eggs; 10, the birds (e. g. ducks etc.) which stay about the island in winter lay eggs; 11, the seals pair; 12, the porpoises pair [1]. For the Thlinkit two lists are given, the first, from Sitka, beginning with August: — 1, takes its name because all birds then come down from the mountains; 2, 'small moon' or 'moon-child', so called because fish and berries then begin to fail; 3, 'big moon', because the first snow then appears, and bears begin to get fat; 4, month when people have to shovel snow away from their doors; 5, month when every animal on land and in the water begins to have hair in the mother's womb; 6, 'goose month', because it is that in which the sun starts back and people begin to look for geese; 7, 'black-bear month', the month when black and brown bears begin to have cubs and throw them out into the snow; 8, the month when 'sea-flowers' and all other things under the sea begin to grow; 9, 'real-flower month', when flowers, nettles, etc. begin to shew life; 10, 'tenth month', when people know that everything is going to grow; 11, 'eleventh month', the month of salmon; 12, 'month when everything is born'; 13, 'month when everything born commences to fatten'. The second list, from Wrangel, begins with January: — 1, 'goose moonth', perhaps so called because the geese were then all at the south; 2, 'black-bear month', the month when the black bear turns over on the other side in his den; 3, 'silver-salmon month': the reason of the name is unknown, this is not their proper month; 4, 'month before everything hatches'; 5, 'month when everything hatches'; 6, meaning unknown; 7, 'month when the geese cannot fly'; 8, 'month when all animals prepare their dens'; 9, 'moon child' or 'young moon'; 10, 'big moon'; 11, 'moon when all creatures go into their dens'; 12, 'ground-hog-mother's moon'; the thirteenth month is missing [2]. The author's report consists in part of extremely doubtful

[1] Schiefner, p. 204. [2] Swanton, *Tlingit*, pp. 425 ff.

explanations of the natives, and the whole seems hardly to be in order: here, as everywhere, the memory of the old names of the months has begun to fade away. The type to which the list belongs, however, is well known.

Among the Shuswap of British Columbia the months have two classes of names. They are called 'the first month' etc., or have recognised names derived from some characteristic. The names among the Fraser River division, and their special characteristics, are as follows: — 1, or 'going-in time'. People commence to enter their winter houses. The deer rut. 2, or (name not translated). First real cold. 3, or (d:o). Sun turns. 4, or 'spring (winds) month'. Frequent Chinook winds. The snow begins to disappear. 5, or '(little) summer (month)'. Snow disappears completely from the lower grounds. A few spring roots are dug, and many people leave their winter houses at the end of the month. 6, or (name not translated). Snow disappears from the higher ground. The grass grows fast. People dig roots. 7, or 'midsummer (month)'. People fish trout at the lakes. 8, or 'getting-ripe month'. Service-berries ripen. 9, or 'autumn month'. Salmon arrive. 10, or (name not translated). People fish salmon all month. 11, or (d:o). People cache their fish and leave the rivers to hunt. Balance of the year, 'fall time'. People hunt and trap game in the mountains[1].

The moons used by the Spences Bridge band of the Thompson Indians in the same country, and their principal characteristics, are: — 1, the deer rut, and people hunt. 2, 'going-in time', so named because most people went into their winter houses during this month. The weather begins to get cold, and the people go into their winter houses. 3, bucks shed their antlers, and does become lean. 4, 'spring (winds) time', so named because Chinook winds generally blow in this month, melting all the snow. The weather improves, and the spring plants begin to sprout. The people come out of their winter houses. 5, 'coming-forth time', so named because the people come forth from their winter houses in this month, although many came out in the fourth month. The grass grows.

[1] Teit, *Shushwap*, pp. 517 ff.

6, the people catch trout with dip-nets, and begin to go to the lakes to trap fish. The trees put forth leaves, and the waters increase. 7, the people dig roots. 8, 'they are a little ripe'. The deer drop their young, and service-berries begin to ripen. 9, 'middle time', so named because of the summer solstice. The sun returns, and all berries ripen. Some of the people hunt. 10, 'first of run', first or 'nose' of ascending fish. The sockeye or red salmon run. 11, the Next Moon, or '(poor) fish', 'they reach the source'. The cohoes or silver salmon come, and the salmon begin to get poor. They reach the sources of the rivers. 12, the Rest of the Year, or 'fall time'. The people trap and hunt, and the bucks begin to run [1].

The Lower Thompsons also called the months by numerals up to ten or sometimes eleven, the remainder of the year being called the autumn. Their names are as follows: — 1, the rutting-time of deer. 2, 'going-in'. People go into their winter houses. 3, 'the last going-in'. 4, 'little coming-out', 'spring or warm wind'. Alternate cold and warm winds. Some people camp out in lodges for a time. 5, 'going-in-again'. Last cold. People go into winter houses again for a short time. 6, 'coming-out'. Winter houses left for good. People catch fish in bag-nets. 7, people go on short hunts. 8, people pick berries. 9, people commence to fish salmon. 10, people fish and cure salmon. 11, or 'to boil food a little', so named because people prepared fish-oil. Autumn. People hunt large game and go trapping. The moons are grouped in five seasons [2]. The names of the Lillooet Indians are similar, eleven moons and the rest of the year, the fall [3].

From the Kwakiutl of Vancouver Island series have been obtained for four different tribes, the first and second tribes having identical names for the months 2—8 and 10. The author states that the knowledge of the moons seems to be disappearing, and that it was difficult to obtain quite satisfactory evidence: consequently he does not claim that his arrangement is perfectly accurate. As a matter of fact some confusion seems to have crept into the series. The names of the months, corresponding to our March onwards, are as follows: —

[1] Teit, *Thompson*, pp. 237 ff. [2] *Ibid.*, pp. 238 ff. [3] Teit, *Lillooet*, pp. 223 f.

I	II	III	IV
1. Raspberry-sprouting season, or olachen-fishing season.	Tree-sprouting season.	Under (elder brother).	No sáp in trees(?)
2.	Raspberry season.	Next one under (elder brother).	Raspberry season.
3.	Huckleberry season.	Trying- oil moon.	Huckleberry season.
4.	Sallalberry season.	Sockeye moon (?)	Sallalberry season.
5.	Season of ?	Between good and bad weather.	South-east wind moon.
6.	Past (i e. empty) boxes (?)	Raspberry season.	Sockeye moon.
7.	Wide-face.	Eldest brother.	Elder brother.
8.	Round one underneath, i. e. Moon after Wide-face.	Right moon (?)	Under (elder brother).
9. Dog-salmon month.	Season of ?	Sweeping houses, i. e. for winter ceremonial.	Pile-driving moon.
10.	Cleaned, i. e. of leaves.	Staying in dance house (?)	Fish-in-river moon.
11. Spawning season.	Season of flood (?)	Spawning season.	(?)
12. First-olachen-moon.	Near to olachen-fishing season.	Elder brother.	Nothing on it(?)

Between the tenth and twelfth the author inserts the winter solstice, and says that the solstice moons are called by a name which probably means 'split both ways': he adds that the readjustment is made in mid-winter [1].

Of the Siciatl of British Columbia it is said that they divide the year into twelve parts corresponding approximately to our months: in these divisions the moon seems to play a very subordinate part. In fact they are to be described as seasons, since to their names is prefixed the same word, *tem,* as to the three main seasons, e. g. *tem tcim,* 'cold time', winter, *tem kaikq,* eagle-time, 1, January, so called because, as it is asserted, the eagle hatches its eggs at this time. Further: — 2, time when the big fish lay their eggs; 3, budding time; 4, time of the *lem,* an unidentified bird of passage which remains about a month; 5, time of the diver, which in this month builds its nest and lays eggs; 6, 'salmon-berry' time; 7, 'red-cap' time, a kind of raspberry; 8, sallalberry time; 9, time when the fish stop running; 10, time when the leaves fade; 11, time when the fish leave the streams; 12, time when the raven lays his eggs [2]. However these divisions are doubtless originally moon-months, as is suggested by the number twelve. Probably the native time-reckoning has fallen into decay and been forgotten under European influence. This is everywhere the case, especially in regard to the moon-month. The Stselis of the same district begin the year in autumn at October, and name the months as follows: — 1, spring-salmon spawning season; 2, dog-salmon spawning season; 3, dancing season; 4, season for putting paddles away — from which they number from 5 to 10. The time between July and October was denoted by a word which means the coming together or meeting of the two ends of the year. The latter part of this division was also known as the time of the dying salmon, since the creeks were at this time full of dead and dying salmon [3]. This list of months is curious, but its peculiarities — the ceasing of the counting at ten, — and even the naming of the first four months — are to be found among the Romans [4]. How-

[1] Boas, *Kwakiutl,* pp. 412 ff. [2] Hill Tout, *JRAI, 34,* p. 34. [3] *Ibid.,* pp. 334 ff. [4] Cp. the lists from the Yakuts p. 179 and the Tunguses p. 178.

ever it bears so little resemblance to all the other lists known to us from this district that it becomes doubtful whether it is original or a product of decay.

The name Piskwaus or Piscous is given to a small tribe that lives on the little river which falls into the Columbia about 40 miles below Fort Okanagon. Their months, obtained from a chief, shew that their habits are much the same as those of their neighbours, the Salish, for the names of many of the months have reference to some of their most important usages. One of the chiefs (viz. of the Piskwaus) made only twelve names, while the other (of the Salish) reckoned thirteen. Both had some difficulty in calling to mind all the names. In several the Piskwau chief is one moon ahead of the other, which may arise from a mistake or possibly from some slight difference of seasons at the two places. The list begins at the time of the winter solstice: — 1, not translated; 2, 'cold'; 3, a certain herb; 4, 'snow gone'; 5, a bitter root; 6, 'going to root-ground'; 7, *camass*-root; 8, 'hot'; 9, 'gathering berries'; 10, 'exhausted salmon'; 11, 'dry'; 12 (missing in the Piskwau list) 'house-building'; 13, 'snow' [2].

The naming of the months from seasons (in the sense of chapter II) is wide-spread over the whole of North America; only under the curious civilisation of Arizona and neighbouring districts does the system present special features.

The Creek Indians began the year immediately after the celebration of the *busk* or ripening of the new corn, in August. The moons are: — 1, big ripening; 2, little, and 3, big chestnut; 4, falling leaf; 5, big winter; 6, little winter, or big winter's young brother; 7, windy; 8, little, and 9, big spring; 10, mulberry moon; 11, blackberry moon; 12, little ripening moon [2]. An early French author relates of certain tribes in Nouvelle France (western Canada) that they divide the year into twelve moons which are named from animals but correspond to our months. January and February are the first and the second moons in which the bear brings forth its young, March is the moon of the carp, April that of the crane, May that of the maize, June the moon in which the bustard moults, July the month

[1] Hale, pp. 210 ff. [2] Hastings, p. 66.

of the rutting of bears, August the rutting-time of bulls, September the rutting-time of deer, October that of elks, November the rutting-time of the roebuck, December the moon in which the roe sheds its horns. The tribes who live by the sea call September the moon in which the trout spawn, October the moon of the whitefish, November that of the herring; to the other moons they give the same names as the inhabitants of the interior [1].

Another traveller at the end of the 18th century relates of the Sioux and Chippewa that they divide the year into twelve moon-months to which from time to time an extra month, known as the lost month, is added. March is the first month of the year, and begins as a rule at the new moon after the spring equinox: it is called the moon of the worms, since the worms then leave their holes under the bark of trees or the other places where they have been hiding during the winter, April is the moon of the plants, May, the moon of flowers, June, the warm moon, July, the moon of the roe-buck, August, the moon of the sturgeon, which are then caught in great numbers, September is the moon of the maize, since it is then reaped, October is the moon of journeys, since the people leave the villages and depart to the district in which they intend to hunt in the winter, November, beaver's moon, since this animal then goes back into its lodge after having collected winter stores, December, hunting-moon, January, cold moon, February, snow moon, because most snow falls in that month [2].

A fairly contemporary account of the tribes of Pennsylvania runs: — The months have each a separate name, but not the same name among all tribes, since the names refer chiefly to the climate of the district, and the benefits and good things enjoyed in it. Thus the Lenope, who lived by the Atlantic Ocean, called March the month of shads, since the shad then came up from the sea into the rivers to spawn; but since in the district to which they afterwards migrated this fish is not found, they changed the name of the month and called it the juice-dripping or the sugar-refining month, since at this

[1] De la Potherie, II, 331. [2] Carver, pp. 175 ff.

time the juice of the sugar-maple begins to flow. April is called the spring month, May, the month of plants, June, 'deer half-month', or the month in which the deer bring forth their young, or also the month in which the hair of the deer is reddish, July, the summer month, August, corn-ear month, since the ears of corn (cobs of maize) can then be roasted and eaten, September, autumn month, October, gathering or harvest month, December, hunting month, which is the time when all deer have shed their horns, January, mouse and squirrel month, since these animals then come out of their holes, February, month of frogs, since on warm days the frogs begin to make themselves heard. The translator adds in a note: — November, hunting month, December, month in which the stags shed their horns[2]. Some tribes give to January a name which signifies 'the return of the sun to them', probably because the days once more become longer. The names are therefore not the same for all tribes, and those of the Moonsey, a tribe of the Delaware, do not even agree with one another[1].

The following is very instructive both for the influence of the natural phenomena upon the terminology and for the fluctuating character of the terminology itself: — The wild rice is an important article of food for the tribes of the west by the Great Lakes; three important branches of the Algonquin, and also smaller tribes, name one or two months from this plant. The Ojibwa call August or September the moon of the gathering of wild rice, or the wild rice moon; the Ottawa, Menomini, and Potawatomi have the wild-rice-gathering moon, which among the last-named corresponds to the end of September and the beginning of October; the Dakota call September 'ripe rice moon', October is the moon in which the wild rice is gathered and laid up for the winter; according to Neill, September is the moon when the rice is laid up to dry, October the 'drying-rice moon'; according to Long, September is 'the

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[1] Heckewelder, p. 524. The translator quotes Loskiel, *Gesch. der Mission der evangelischen Brüder unter die Indianer in Nordamerika*, Barby, 1789.

beginning', October 'the end of wild rice'; according to Atwater September is 'the moon when the wild rice is ripe' [1].

A list of the Dakota months gives: — January, the hard moon; February, the raccoon moon; March, the sore-eye moon; April, the moon in which the geese lay eggs, or when the streams are navigable, — among the Teton, moon when the ducks come back; May, the planting moon; June, the moon when the strawberries are red, — Teton, when the seed-pods of the Indian turnip mature, or when the *wipazoha* (berries) are good; July, the moon when the choke-cherries are ripe, or when the geese shed their feathers, — Teton, the deer-rutting moon; August, the harvest moon, — Teton, the moon when the plums are red; September, the moon when rice is laid up to dry, — Teton, moon in which the leaves become brown; October, the drying rice moon, — Teton, moon when the wind shakes off the leaves, or corn-harvest moon; November, the deer-rutting moon, — Teton, the wintermoon; December, the moon when the deer shed their horns, — Teton, the midwinter moon [2].

Some of the tribes of the Cheyenne name twelve moons in the year, but many tribes have not more than six; and different bands of the same tribe, if occupying widely separated sections of the country, will have different names for the same moon. Knowing well the habits of the animals, and having roamed over vast areas, they readily recognise any special moon that may be mentioned, even though their name for it may be different. One of the nomenclatures used by the Teton-Sioux and the Cheyenne, beginning with the moon just before winter, is as follows: — 1, moon when the leaves fall off; 2, when the buffalo cow's foetus is getting large; 3, when the wolves run together; 4, when the skin of the foetus of the buffalo commences to colour; 5, when the hair gets thick on the buffalo foetus, called also 'men's month', or 'hard month'; 6, the sore-eye moon, buffalo cows drop their calves; 7, moon when the ducks come; 8, moon when the grass commences to get green and some roots are fit to be eaten; 9, moon

[1] Jenks, *Wild Rice*, pp. 1089 f. [2] Riggs, *Dict.*, s. v. *wi*, 'moon'.

when the corn is planted; 10, when the buffalo bulls are fat; 11, when the buffalo cows are in season; 12, when the plums get red [1].

The Omaha name the moons as follows, from January on: — 1, when the snow drifts into the tents of the Honga; 2, the moon when geese come home (back); 3, the little frog moon; 4, the moon in which nothing happens; 5, the moon in which they plant; 6, the buffalo bulls hunt the cows; 7, when the buffalo bellow; 8, when the elk bellow; 9, when the deer paw the earth; 10, when the deer rut; 11, when the deer shed their antlers; 12, when little black bears are born. The Oto and Iowa tribes use the same names for the months, except for January, which is called 'the raccoon month' [2]. The Kiowa have twelve months, but some writers give 14 or 15, the names of which are repetitions of the others. As to the first eight all are unanimous, for the ninth all informants but one are in agreement, for the following there is disagreement. The list, which begins in Sept.—Oct., comes from an Indian specially well versed in the calendar. 1, the 'ten-colds moon': the first ten days are cold, after the full moon winter and the new year begin; 2, 'wait until I come' (*äganti* without the word *p'a,* 'moon'); 3, 'geese-going moon', sometimes 'sweathouse moon'; 4, 'real-goose moon'; 5, 'little-bud moon', the first buds come out: the first half belongs to winter, the second to spring; 6, 'bud moon', sometimes with 'great' prefixed; 7, 'leaf moon'; 8, summer *äganti:* its full moon forms the boundary between spring and summer; 9, 'summer-geese-going moon', seems to be placed too late; 10, 'summer-real-goose moon'; 11, 'little-moon-of-deer-horns-dropping-off', the deer begin to shed their horns; 12, similarly named, or sometimes with the addition of 'great': with this full moon autumn begins [3]. The year of the Pawnee varied between 12 and 13 months; the names are not given [4], nor are those of the Klamath and Modok [5], or of the Occaneechi of Virginia [6]. The Bannock call the earlier months: — 1, running season for game; 2, big moon; 3, black

[1] Clark, p. 16. [2] Fletcher and La Flesche, p. 111. [3] Mooney, *Kiowa,* pp. 368 ff. [4] Dunbar, p. 1. [5] Gatschet, p. 1. [6] Beverley, p. 4.

smoke (it is cold); 4, bare-spots-along-the-trail (the snow vanishes in places); 5, little grass, or the grass first comes up; for the months of the warm season they have no names [1]. For the Mandan there is a list with twelve months, which I have been unable to obtain: the 'seven-cold-days' month, the pairing month, and the 'sore eye' month are quoted [2].

The Seminole of Florida count 12 months, only the following names are translated: — 1, little winter; 2, wind moon; 3, big wind moon; 4, little, and 5, big mulberry moon; 12, big winter. 7 and 8, 9 and 10 are also paired, the latter in each case being described as 'big'; 6 and 11 have single names [3]. The Chocktaw of Louisiana have forgotten their names, only a few could be enumerated: — December, cold moon; February, moon of snow; March, moon of wind; April, corn (-planting) moon; July, moon of fire. The women asserted that the year was divided into twelve moons, but our authority thinks it highly probable that thirteen is the correct number [4]. The Natchez had 13 months, and celebrated at each new moon a feast which took its name from the principal fruits gathered or the animals hunted in the previous month. Their year began in March. 1, moon of the deer; 2, moon of the strawberries, which are then gathered; 3, moon of the little corn: this was often awaited with impatience, their harvest of the great corn never sufficing to nourish them from one harvest to another; 4, moon of the water-melons; 5, moon of the peaches; 6, moon of the mulberries; 7, moon of the maize, or great corn; 8, moon of the turkeys, which at that time come out from the thick woods into the open woods; 9, moon of the bison, which are then hunted; 10, moon of the bears; 11, moon of the cold meal; 12, moon of the chestnuts, although these have long since been collected; 13, moon of the nuts (which is added to complete the year). The nuts are crushed and mixed with flour to make bread [5].

The tribes of Arizona, among whom religion and ceremonial rites have attained a pre-eminent place, occupy a special position; their time-reckoning has developed into a ceremo-

[1] Clark, p. 372. [2] Matthews, p. 4. [3] MacCauley, p. 524. [4] Bushnell, p. 17. [5] Du Pratz, II, 354 ff.

nial year. However the natural foundation peeps through. Among the Hopi thirteen names with the addition *mii'iyawu*, 'moon', are given, so that genuine moon-months must be implied. The second part of *iicii*, October, is said to be called *tii'hoe;* if this is recognised as a month, there are 14 of them. Several of the priests say that there are 13 months, others 12, still others 14. It is to be noted that the seasons and the festivals are determined by observation of the sun in relation to certain terrestrial marks; of these sun-points there are 13. The names of the months are not translated: several recur, but not in the same order, 1 = 8, 2 = 10, 5 to 7 = 11 to 13. But it is stated also that the months are divided into 'named' and 'nameless' [1]. The Zuñi divide the year into two seasons, each consisting of six months. The months are: — December, turning or looking back (of the sun); January, limbs of trees broken by snow; February, no snow in the road; March, little wind month; April, big wind month; May, no name. The same names are said to recur in the second half-year! [2] This can only be an entirely conventional arrangement. But according to other sources the six later months, though called 'the nameless', have ritualistic names (Yellow, Blue, Red, White, Variegated, Black) derived from the colours of the prayer-sticks offered up at every full moon to the gods of the north, west, south, east, zenith, and nadir, who are represented by these colours [3]. The Pima have 12 months. Two different lists from two natives are given. (I): — 1, saguaro harvest moon; 2, rainy; 3, short planting; 4, dry grass; 5, winter begins; 6, yellow; 7, leaves falling; 8, cottonwood flowers; 9, cottonwood leaves; 10, mesquite leaves; 11, mesquite flower; 12, black seeds on saguaros. (II): — 1, wheat harvest moon; 2, saguaro harvest; 3, rainy; 4, short planting; 5, dry grass; 6, windy; 7, smell; 8, big winter; 9, gray; 10, green; 11, yellow; 12, strong [4]. The names of colours recur, but seem here to have reference to the seasons. That the wheat culture has been newly introduced does not by any means imply that the series of months is of recent origin, but only points to the familiar instability of their names.

[1] Fewkes, *15,* p. 256. [2] Stevenson, p. 108. [3] *Handbook,* p. 189, from Cushing. [4] Russel, p. 36.

For South America I find in the literature accessible to me no names of months recorded, except for the Inca people alone. Their series of months, which is collected from various sources, runs (beginning about January): — 1, small growing moon; 2, great growing moon; 3, flower-growing moon; 4, twin-ears moon; 5, harvest moon; 6, breaking-soil moon; 7, irrigation moon; 8, sowing moon; 9, moon of the Moon-feast; 10, moon of the Feast of the province of Uma; 11, moon of the Feast of the province of Ayamarca; 12, moon of the Great Feast of the Sun. The ceremonies in connexion with this last festival were made to approximate to the moon's phases, the various stages commencing with the ninth day, full moon, and the 21st day.[1] Nowadays the ability to bring the lunar year into agreement with the solar is usually denied to this people, although older writers have claimed this knowledge for them[2]. This is naturally correct, in so far as a leapyear cycle is meant; but it seems to me unlikely that the Inca people was unable to bring the moon-months into their proper position in the year by an occasional intercalation of a thirteenth month, when this became necessary. The not nearly so highly civilised Indians of North America could do this, and the Incas observed the solstices. The first eight names alone shew that. Perhaps the other months, as among certain tribes of N. American Indians, were originally nameless (it was no doubt the time when there was no work in the fields); that the names are of late origin is shewn by the reference to various provinces of the kingdom. The tribes of Bolivia also have moon-months[3], and among the Orinoco Indians months are mentioned[4]. The Karaya of Central Brazil know that the year has 13 full moons[5].

In Africa the lists of months are not so numerous as in the parts of the world hitherto mentioned. There are however plenty of them, and that not among the peoples most deeply influenced by civilisation: among such peoples the Islamite months have gained admission. In Morocco, southern Algeria, and even in the Sudan the Julian months are also found. The

[1] Hastings, p. 69. [2] E. g. Garcilasso de la Vega, I, 200. [3] Cherˇvin, p. 229; Nordenskiöld, *Kulturh.*, p. 219. [4] Gilij, II, 233. [5] Krause, p. 339.

examples of a reckoning in months which relates to the seasons come from South and Central Africa, and therefore from the districts which have been more free from foreign influence.

The Hottentot series of months has fallen into decay. I reproduce the list of Schulze, who mentions another in Kroenlein, *Wortschatz der Khoi-Khoin* (Berlin, 1899), which has only nine names. His February corresponds to Schulze's January; only in the position of the name for July, which Schulze claims for October, do the two lists differ considerably. The list, the positions of the months, and other statements come from an old Hottentot woman. The author however could not be quite sure that the ideas of the whites had not already influenced the number of months and their succession. The month begins when the crescent of the moon appears in the western sky. 1 (corresponds to about January), moon which follows upon the *salsola*-bush, which is an important pasture-bush and has its principal flowering-season in spring; 2, not translated; 3, when it begins to be cold; 4, by older Hottentots explained as the month of increasing cold: when one sits so near the fire that the legs blister; 5, the black month, time of drought, the black branches of the stripped bushes give the landscape this character; 6, not translated; 7, month of the Pleiades, which become visible in the latter half of June, and are of importance for the natives journeying in quest of *tsama;* 8, not translated; 9, the month when the leaves are curled up by the cold; 10 and 11, not translated; 12, named from the fact that when, after the first productive rains upon the old and withered grass, the fresh young green shoots up, the meadows appear to be dappled [1].

For the Basuto a native gives the following list: — 1, *phato* = August, begins the year; 2, *loetse,* from *loetsa,* 'to anoint wounds with fat, syringe the ear', since the winter is broken and a little warmth comes; 3, *mphalane, mphalane 'a leshoma, leshoma* a kind of bulb which at that time begins to sprout, perhaps from *liphalana,* to glitter, the sun glitters, does not warm, or because of the girl-circumcision, which is announced by means of the blowing of *liphalana*-flutes by the old

[1] Schulze, p. 370.

women who perform the operation; 4, *pulungoana,* diminutive of *pulumo,* gnu, which at this time brings forth its young; 5, *tsitoe,* grasshopper, which is especially to be heard at this time; 6, *pherekong,* perhaps 'interjoin sticks'; 7, *tlhakola* = *hlakola,* to wipe off, *tlhakola molula,* to wipe off the *molula: molula* is the stage at which the *mabele* grain is still completely enveloped in the husk: now the grains shoot forth and the *molula* disappear, *molula* also means a kind of grass which is used in basket-work; 8, *tlhakubele,* from *thlaku,* grains: therefore: — the *mabele* plant has grains; 9, *'mesa, 'mesa tseleng,* kindling fire by the roadside, as is done by those who drive away the birds from the fields, either to warm themselves or to roast ears of corn; 10, *motseanong,* i. e. 'bird-laugher', since the grains are by now so firmly fixed in the ears that the birds cannot get them; 11, *phupjoane,* from *phupu,* 'beginning to swell', with reference to a kind of bulb; 12, *phuphu,* 'bulging out', i. e. bulbs and the stems of some hardy plants [1].

Of the Caffres we are told: — They count in the year only twelve months, and for these they have names: the result is frequent confusion and difference of opinion as to which month it really is. There is, for example, the month of the cuckoo, when this bird is first heard, the month of the erythusia, when this plant blossoms, the month of much dust, midwinter. The names of the moons are more or less descriptive of the season, e. g. *newaba,* green, describes the first appearance of the vegetation; *furnfu,* September, cattle licking green grass; *zibandhlela,* October, footpaths being covered with grass; *hlolange,* January, time to look for first-fruits; *hlangula,* May, time of falling leaves [2]. Unfortunately the complete list is not given.

By the Baronga the months or moons are now almost completely forgotten, at least among the southern clans. The following statements come from the northern clans, where the names have been better preserved; — *nhlangula,* the month in which the flowers are swept from the trees, probably October, in which various trees blossom; *nwendjamhala,* the month in which the antelope *mhala* brings forth its young (November?);

[1] Sechefo, *4,* 931 ff., *5,* 71 ff. [2] Macdonald, *JRAI, 19,* p. 291.

mawuwana, when the *tihuhlu* are plucked, because the people shout '*wuwana, wuwana*' in their joy at having plenty of almonds to suck (December); *hukuri* is said to be the month when the fruits of the *nkwakwa* are ripe (December also?); *ndjati* or *ndjata,* i. e. 'I am coming'. It is the time of *nwebo,* when everyone in his fields is eating the new cobs of mealies, and if you call, a person will answer: — "I come directly! Have patience! I am busy". This may be January or February. *Sunguti* is also one of the summer months; *sibamesoko,* the moon which closes the paths, also called *dwebindlela* or *sibandlela* (February), is the time when the grass grows so high that it hides the paths; *nyenyana, nywenywankulu* are the months of the birds *(nyenyana),* when one spends the time in chasing them from the fields (March and April); *mudashmi,* i. e. 'What am I to eat?' is so named because in the harvest month there are so many different kinds of food that you do not know which to choose (May or June); *khotubushika,* i. e. 'when winter comes', is probably June or July [1].

For the Herero the following list is given: — 1 (January), month of rain; 2, lambing month; 3, first pools of water; 4, last pools of water; 5, lily month; 6, month of good luck; 7, rising of the water in the river beds; 8, month of fog; 9, Pleiades month: the Pleiades become visible and then *okuni,* spring, begins; 10, first month, and therefore the first month in the Herero reckoning (*sic!* probably of the spring, cp. the following); 11, last moon namely the last month, of spring; 12, dry, hard moon [2]. Another list has: — 1 (January), Vley water; 2, birth-time of springboks; 3, last Vley water; 4, last rain-showers; 5, cold days; 6, dry period; 7, dry trees; 8, lambing season; 9, a lily begins to bud; 10, the milk-bushes become green; 11, the rain begins; 12, wet period [3].

In Loango the names of the months differ considerably according to the situation of the district and the influence of this upon the habits of life: — Month of expectation, month of the little rains, of drought, of the curse, of the great rains, of the water, of men, of women, of the harvest, of the vanishing

[1] Junod, *Ronga,* II, 284 ff. [2] Irle, p. 224. [3] François, *Nama und Damara,* Magdeburg, 1895, p. 185 f., quoted from Ginzel, II, 142.

water, of fish, of the rice, of trade, of mist, of salt, of sleep, of the huts, of the burning (of grass and brushwood), of mirth, of labour, of aid, between-month, cold month, wood month, bud month, besom-and-dirt month (great cleaning), and any other terms in popular use [1].

Some of the tribesmen of Upper Wellé give to the months names in keeping with what is done in them. Thus one month is named as that in which they sow *maroo,* the chief ingredient used in brewing native beer; another as the season when *maroo* must be cut. Following this comes the 'bad-water' month, when the risk of fever is greatest; then the elephant month, when they catch elephants by burning grass, and the white-ant month, during which white ants are collected, and considered a great delicacy; and a second *maroo* month, when a second crop is sown. The month next to this has no distinctive name, and is succeeded by the second *maroo*-harvest month, the hungry or water-month, when provisions are scarce; the second ant-gathering month; a late sowing month, and finally another with no particular title. Altogether 13, therefore [2]. For the Shilluk twelve months are enumerated without translation: 'moon' and 'month' are expressed by the same word [3]. The Akamba of British East Africa assert that they reckon eleven months to the year, *anzwa:* — 1, *mwa,* planting month; 2, *wima,* time of the autumn rains; 3, *wiu,* month of sprouting; 4, *mveu,* 5, *onkonono,* both untranslated; 6, *thandatu,* commence reaping; 7, *moanza,* not translated; 8, *nyanya,* 'friend' *(sic!);* 9, *kenda,* 'nine'; 10, *ekumi,* 'ten' (in 1907 this month began on August 10); 11, *mubiu,* season of grass-burning. They say that the month has 31 days and that they see the new moon on the 32nd; they assert that they do not include the first day on which the moon is seen [4]. The system has evidently already fallen into decay, so that too great importance must not be attached to its peculiarities. The Wa-Sania of British East Africa divide their twelve months into three periods of four:

[1] *Loango Exp.,* III: 2, 139. [2] Burrows, p. 56. The land extends from 23° W. long., and runs eastwards to the Nile at the most northerly point of the Congo Free State. [3] Westermann, pp. 103 and 299. [4] Hobley, *Akamba,* pp. 52 ff.

the names are not given [1]. The Wagogo months are: — 1, *mosi,* 'the first', about December; 2, *mhiri,* 'general' (i. e. rains everywhere); 3, *mhalungulu,* 'cessation' (sc. first rains over); 4, *munye,* 'possessing', i. e. enjoying first-fruits; 5, *mwezi we litika,* month of plenty; 6, *mwezi we lisololela,* month of beginning reaping; 7, *mwezi we nhwanga,* threshing-month; 8, *mwezi we taga matoto,* month when the harvest is ended; 9, *mwezi we tutula,* month of forest-clearing; 10, *mwezi we ndawa mbereje,* month of digging up the stubbles; 11, *murisimuka,* budding; 12, *muchilanhungo,* 'partial' (sc. partial rains, not general) [2]. The Nandi begin with the last month of drought, about February: — 1, *kiptamo,* 'hot in the fields'; 2, *iwat-kut,* rain in showers; 3, *wake,* meaning unknown; 4, *ngei,* the heart pushed on one side by hunger; 5, *rob-tui,* black rain or black clouds; 6, *puret,* mist; 7, *epeso,* meaning unknown; 8, *kipsunde,* offering to God in the corn-fields; 9, *kipsunde oieng,* second offering to God; 10, *mulkul,* strong wind; 11, *mulkulik oieng,* second strong wind; 12, *ngotioto,* the *Brunsvigia Kirkii* or pincushion plant [3].

The Masai divide their twelve months into four seasons. (I), *ol dumeril,* time of the scanty rain-fall: — 1, *ol gissan,* in which the sheep and goats bring forth their young; 2, *ol adallo,* the heat of the sun; 3, *ol golua (loo-'n-gushu).* (II), *en gokwa,* the Pleiades (*l'apaïtin te-'l-lengon,* the months of superfluity): — 4, *le erat (kuj-orok),* formed from *er rata,* 'green valley'; the hitherto scanty rain has been sufficient to cover with fresh green the valleys and low-lying spots of the otherwise still yellow withered steppes; 5, *os somisso (oäni-oingok),* 'the dark', 'gloomy': the sky is overcast, there is much rain, the days are dark and gloomy; 6, *ol nernerua (loo-'n-gokwa),* formed from *nernerí,* 'fat'. (III), *ol airodjerod,* the lesser after-rains: — 7, *le logunja airodjerod (kara-obo),* also called *oieni oinok,* 'the tied-up bulls': owing to the abundant fodder of the last months the bulls have become wild, and would be continually fighting each other in the meadows, for which reason they are separated; 8, *bolos airodjerod (kiperu),* or also (but more rarely) *ol dat;* 9, *kudjorok (l'iarat),* 'cold', cold weather distinguishes

[1] Barret, *JRAI, 41,* p. 35. [2] Cole, p. 323. [3] Hollis, *Nandi,* pp. 94 ff.

this month. (IV), *ol aimeii,* time of hunger, of drought: — 10, *kiber (pushuke),* uproar, quarrel. The pasture is thin, the milk scanty, and people try to steal from other persons' cows: at last the milk is not sufficient to satisfy the necessary demands of hunger, and most of the warriors go off into the forest with some of the oxen to eat flesh. This lasts not only throughout this month but also during the next. 11, *ol dongosh,* 'stretched', since in this month too the milk is very scarce. The name seems to be derived from the word *en gushush,* 'lack of food'. Only at the beginning of the 12th month, the *boshogge (ol-oiborare),* do the people come back to the kraal. I have followed Merker, p. 156. Hollis, pp. 333 ff., gives in some cases other names, which unfortunately are not translated; they are here given in brackets. Nos. 4 and 9 have exchanged names. It is worthy of note that the month of the evening setting of the Pleiades *(gokwa)* is named from this constellation. A further variation is that according to Hollis the first month is *kara-obo.* The year therefore begins with the season of the after-rains.

The Wadschagga of Kilimanjaro have likewise twelve months; ten are denoted by numerals; the counting begins at the fifth, and the months are divided into seasons. Nos. 5—8 fall in the season of the great rains, 9 and 10 in the dancing season. In the ninth the people say: 'It is bright'; the rainy season passes away, and for this reason this month is regarded as the beginning of the year, sacrifices are offered up at the gates of the country, the chief 'raises the field-stick', i. e. gives permission for the beginning of the ploughing, after having previously 'let the year open' by offering a special sacrifice to the spirits for good fruit and harvest. The name of the following month, *iyana,* now means 'a hundred', but formerly it probably had the sense of 'ten'. This, the 10th, month is followed by the first; the 1st and the 2nd months fall in the first warm season, the 3rd in the little rainy season. The three months of the great heat are not denoted by numerals. They are interpolated between the 3rd and the 5th months. The first of these is called *nsaa:* a month known as the fourth is then said to be missing, but our authority conjectures that *nsaa* is perhaps a mutilated form of an old word for four; the month

that follows *nsaa* is called *muru,* which is left unexplained, and the next is *nsangwe* or *nsango.* Then the 5th month comes again. The name *nsangwe* is almost everywhere explained by the people as arising from *nsana-ngwi,* 'to collect wood for burning'. The supplies of wood for the rainy season are collected. The position of this month immediately before the rainy season misleads them into thus explaining the similar sound. These last two months are clearly to be recognised as interpolations in the original scheme of ten months. But there still exists a name for a thirteenth month, which is of course necessary for the correcting of the lunar year, and which, as the old folks say, was formerly actually counted. But now they say: — "It is a sham month, since it has no companions, no comrades, and therefore it is superfluous. The year has only twelve months." It is called *nkinyambwo.* The people say: — "The *nkinyambwo* is no longer necessary, since the rainy season has now only three months, not four as in olden times." The practice of beginning an enumeration of the months with the 5th month *kusanu* arouses the suspicion that this may be the actual beginning of the year. To this the other names of this month also point: 'on the boundary of the year', or *maraya a kisie,* which can now only be translated as 'the ender of the rain'. But as a matter of fact this month ushers in the rainy season. It has therefore been pushed from its former position in the course of the year after the rainy season to a position before the beginning of the period of greatest rains, and the practice of beginning the enumeration with *kusanu* is now the sole reminder of a time when *kusanu* really did introduce the new year at the beginning of the chief ploughing-season. But the first month *nsi* must once have been one of the starting-points of the counting [1]. That the two months above-mentioned are interpolations does not seem to be correct: for the *nkinyambwo* shews that the Wadschagga, like so many other peoples, have had thirteen months, one of which was omitted when necessary. The process seems clear from the statements given. When the thirteenth month (probably under Islamite influence) passed out of

[1] Gutmann, pp. 239 ff.

use, in the now strictly lunar year the months got out of place in reference to the seasons. If the fifth month *kusanu* keeps the place in reference to the seasons to which its other names point, it falls in the ninth month of the author's list, *kukendu,* which, according to natural conditions, is the beginning of the year. That only ten months are numbered and the others named affords independent evidence, and is in keeping with the system of counting in tens. That the two months in question are inserted between the third (or fourth) and the first points to a conventionalising of the system such as is anything but primitive. Here, as always, numbered months shew themselves to be a late phenomenon.

Curious names of months, of a kind which we have hardly met with hitherto, are found in the comparatively highly civilised Hausa states (Kano, Sokoto), where the Arabic and Julian names for the months are also known. 1 (January), *wata-n-tshika-n-shekara,* or *tshiki,* 'month of the filling of the belly', since much food is eaten, especially at full moon, or *wata-n-wauwo,* month of the *wauwo*-game (with torches); 2, *wata-n-gani,* month of the *gani*-game; 3, *wata-n-takutika,* month of the *takutika*-game, or *wata-n-takulufu*; 4, *ware-ware-n-farin;* 5, *ware-ware-n-biu;* 6, *ware-ware-n-aku. Ware-ware* is the name of a small bird which builds its nest in a hole in the ground; it is therefore doubtful to which element it belongs. And so it is with these three months, April, May, June, in which no games take place, so that it was not known where to place them; for this reason they are called the 1st, 2nd, and 3rd *ware-ware.* The word also denotes a person who talks now one way, now another, a doubtful person. 7, *wata-n-azumi-n-tsofafi,* month of the fast of the old people; 8, *wata-n-sha rua-n-tsofafi,* month of the old people's water-drinking; 9, *wata-n-azumi,* month of fasting; 10, *wata-n-karama-n-salla,* month of the little *salla* festival; 11, *wata-n-bawa-n-salloli,* month of the slaves, in this month all (but especially the slaves) have much work for the festival of the following month; 12, *wata-n-baba-n-salla,* month of the great *salla* festival, or *wata-n-laiya,* month of the slaughtering of the lamb. The festivals, especially the *salla* festivals, do not always take place in the

months named after them: the time is determined by the priests in accordance with the position of the moon (*wata* = 'moon,' 'month') [1]. This is an artificial system which was probably created with a leaning towards the Arabic months. In Edo too the familiar names of months are borrowed from the ceremonies that take place at different times [2].

Madagascar has a comparatively highly developed civilisation in which various influences cross. The Merina have the Arabic months. The history of the native calendar is said to be very complicated: Grandidier in a detailed discussion seeks to prove that the Malgassian year, which is commonly held to be a lunar year, is a solar or lunisolar one, and on the strength of certain resemblances in the names of the months derives the calendar from S. India. I give the principal data. Grandidier says that one reason for believing that the Malgassian calendar is a solar one is the fact that it is in reality agricultural. In 1638 Cauche says that the Malgassi divide their year into 4 seasons and 12 lunar months, with some intercalary days. The year is for them the time which elapses between two phases of the vegetation; for greater convenience they divide it into twelve lunar months, without caring much about the number of days composing these months, as is rightly said of the Antandroy by Vacher [3], who gives the following list, which is almost identical with that compiled by Grandidier himself in the south-east, at Iavibola, in 1866. The months have names and epithets: the latter are explained. 1, millet is cut; 2, winter begins; 3, the beans flower; 4, the tamarinds of the north are ripe; 5, the leaves fall; 6, tamarinds and beans are ripe; 7, the *Cythere*-tree flowers; 8, the bulls seek the shade of the *sakoa;* 9, the guinea-fowls sleep; 10, the rain rots the ropes (with which the calves are fastened); 11, the gourds flower; 12, the grains of the *fano* are ripe. Rowlands [4] had already remarked that the Betsileo months depend more upon the time of the sowing and reaping of the rice and upon the flowering of certain plants than upon the pha-

[1] Mischlisch, p. 127. [2] Thomas, *Edo*, p. 18. [3] *Etudes ethnogr., Rév. de Madag.*, août 1904, p. 148 f. [4] *Antan. Annual*, 1886, p. 237.

ses of the moon, and that the agreement with the months of the Merina (i. e. the Arabic months) is only approximate. The same applies to the calendar of the Sakalava, the Bara, the Tanala, and the Sihanaka, which is identical with that of the Betsileo. What is here said about the calendars of the peoples of the south and the centre of the island is also true of the calendars of the northern and eastern peoples [1]. To me it seems as though we have here a series of months of the ordinary type, in which the months are named and at the same time fixed with reference to the seasons, although I do not presume to decide upon the complicated question of the Malgassian calendar. There remains one possibility, viz. that the 'months' are seasons with no relation to the moon, but this possibility does not seem to have been seriously considered by those who can make use of the sources, which are only to be got at with extreme difficulty.

Among the primitive peoples of the East Asiatic peninsula the seasons of the agricultural year are very much employed; in comparison with them the moon-month plays no important part. Moreover Indian and Islamite influences have penetrated deeply: the calendar in use arises from these. The facts are well illustrated by a notice from the Malay Peninsula. There are three ways of reckoning the months, (1) the Arabian, 29 and 30 days alternately, (2) the Persian, 30 days, and (3) that of Rum, 31 days; the first is the common method. Some few, with greater accuracy, calculate their year at 354 days 8 hours, intercalating every 3 years 24 hours, or one day, to make up the deficiency, and 33 days for the difference between the solar and the lunar years. But the majority of the lower classes estimate their year by the fruit seasons and by their crops of rice only. Many, however, obstinately adhere to the lunar month and plant their paddy at the annual return of the lunar month [2]. The Guru of Sumatra know a division of the year into twelve months of 30 days each; the months, with the exception of the last two, are denoted by numbers [3]. They are therefore calendar months, not moon-months, and are

[1] Grandidier, pp. 384 ff. [2] Newbold, II, 356 ff. [3] von Bremer, p. 233.

a foreign acquisition. Among the Kayan the month, or, as they say, the moon, plays a greater part than the year: of the latter hardly anyone knows properly how many moons it contains. Commonly they reckon 1 to 2 moons for the sowing, five for the time which the rice needs to ripen, 2 to 3 for the harvest, and three up to the next sowing. The different months have no special names among the Bahau [1]. The time-reckoning of Sumatra, Java, and Bali shews a prevailing foreign (Indian or Islamite) influence. It is to be noted that among many peoples the first ten months are numbered, while the last two have names. In Bali these two names are Sanskrit words [2].

For Timor two lists of moon-months are given, the one from Bibiçuçu, the other from Samoro. The names are in some cases the same, they are not translated and perhaps cannot be explained, but they indicate the occupations of the months. 1, *funu, leet ali,* about October, *vater,* maize, is planted and mountain rice sown; 2, *fahi,* the fields are weeded; 3, *naru,* 'the great month', the maize flowers, heavy rain; 4, *fotan, tora,* the former word probably a corruption of the Malay *potong,* the cutting or harvest month: the maize is housed and a harvest sacrifice offered; 5, *madauk,* harvest of the mountain-rice; 6, *wani,* honey and wax are collected; 7, *uhi, uhi böǫt,* probably a corruption of *ubi,* sweet potato, these are now dug up and collected; 8, *madai böot, uhi kiik,* fogs and heavy rain; 9, *madai kiik, lakubutik,* little rain: during both these months little work can be done; 10, *lakubutik böot, madai,* still showers; 11, *lakabutik kiik, funu,* very hot, only in this month is gold sought for; 12, *leet, leet manuluk,* hot: the grass is burnt off and the ground prepared for maize-planting [3]. It is interesting to note how the names have departed from a common foundation: two names *(funu, madai)* denote different months. Note also the pairs of months in both lists.

The Kiwai Papuans, who are well acquainted with the stars, have a very interesting list of months, compiled from

[1] Nieuwenhuis, I, 317. [2] Ginzel, I, 422 ff.; Friederich, p. 87. [3] Forbes, p. 429.

names of stars and, as it seems, of natural objects. Accurate information about this list has very kindly been personally communicated to me by Landtman [1]. The year is divided into two parts in accordance with the monsoons [2]. The time of the S. E. monsoon *(uro)* embraces the months: — 1, *keke* (Achernar, our April); 2, *utiamo* (the Pleiades); 3, *sengerai* (Orion); 4, *koidjugubo* (Capella, Sirius, and Canopus together); 5, *wapi;* 6, *hopukoruho;* 7, *abu;* and 8, *tagai* (Crux). In the transitional period comes 9, *karongo* (Antares). The time of the N. W. monsoon *(hurama)* includes: — 10, *naramu-dubu* (Vega); 11, *nirira-dubu* (Altair); 12, *goibaru;* 13, *korubutu.* Each month, in the language of the natives called 'moon', is connected with a definitè constellation, as is shewn above, and it is to be presumed that this constellation is properly the one that is to sink down to the western horizon during the month in question. Perfect accuracy does not however prevail in this nomenclature, but several adaptations have been made. (This is natural and necessary, on account of the dislocation of the lunar months with regard to the solar year). Even in the matter of the succession of the months different statements were made, this no doubt being due to the fact that all the natives were not equally masters of the calendar. The statements fluctuate as to whether *karongo* is the last month of the *uro* or the first of the *hurama.* (The fluctuation is natural, since this month falls in the time of transition between the two). In any case this month, like *keke,* the first of the *uro,* comes to have a special meaning. It seems to be somewhat uncertain whether *koidjugubo* exists as the name of a special month or whether the word only denotes a constellation related to the months *wapi, hopukoruho,* and *abu.* The time of the *koidjugubo* is that in which the S. E. monsoon blows hardest. The corresponding middle month in *hurama* is *goibaru. Baidamu* ('the Shark'), the Great Bear, is also related to a certain period during the S. E. monsoon, particularly to *hopukoruho,* in which according to certain statements the head sets, and to *abu,* in which the back fin and the tail set. The

[1] Cp. Landtman, p. 482. My additions are in brackets. [2] See above, p. 57.

setting of each of the various parts of the body of the Shark in the west is accompanied by storms and rain, which arise in the period of the S. E. monsoon. When the Shark is no longer to be seen at evening, and after both its eyes have emerged in the east at morning, the period of the *tagai-karongo* begins, in which the sea-turtles are caught, and the time of the N. W. monsoon is at hand. The turtles are caught more particularly during the time of their copulation, and this begins in *abu,* occasionally in *tagai,* reaches its height in *karongo,* and finishes in *naramu-dubu.* The planting of tubers also takes place in definite months. Unfortunately the meaning of the names that do not refer to constellations is not in all cases clear. *Wapi* in one Torres Straits dialect is said to mean 'fish', and the name is said to refer to the fact that this time is especially favourable for fishing, since the fish are then particularly stupid and easy to catch with the fish-spear. *Hopukoruho* is the name of an earth-wasp: colonies of these insects dig holes in the ground. (Do they appear in particularly great numbers in this month?). *Hopu* means 'earth', and *koruho* 'to eat'. This month is held to be especially dangerous: men are exposed to sickness and death and are bitten by serpents, the canoes suffer shipwreck. It is also expressly stated that the name of the month refers to death and burial. The sense of *abu* is quite uncertain. *Abu* means 'ford' in a creek: the name may perhaps refer to the beginning of the transition to the period of the following monsoon. (Or does it refer to the fact that the fords at the end of the dry season are particularly easy to pass?). The sense of *goibaru* is also quite uncertain, even, as it appears, among the natives. (No statement as to the meaning of *karubuti* is given). *Karongo,* according to the meaning of the word, is said to refer to the transition from *hurama* to *uro*. *Koidjugubo* means 'great constellation'.

For the Melanesians well developed series of months are given: the very instructive statement of Codrington will be found in the next chapter.[1] For the Carolines two lists of names are given, from Lamotrek and from Yap[2]; but they are

[1] Below, pp. 218 ff. [2] Christians, pp. 389, 394.

of no use to us, since they only give twelve names without any explanation. But the list for the Mortlock Islands, a group included in the Carolines, is of great interest, since every month is named after a constellation and therefore is also regulated by it. The names are: — 1, *yis,* Leo; 2, *soropuel,* Corvus; 3, *aramoi,* Arcturus; 4, *tumur,* Scorpio; 5, *mei-sik,* ν, ξ, o Herculis; 6, *meilap,* Aquila; 7, *sota,* Equuleus; 8, *la,* Pegasus; 9, *ku,* Aries; 10, *mariher,* the Pleiades; 11, *un-allual, elluel,* Aldebaran and Orion; 12, *mau,* Sirius [1]. The same system, with names in some cases the same, is given for the southernmost group of the Carolines, the St. David's Islands [2]. The months of the Fijians, beginning at February, are: — 1, *sese-ni-ngasau lailai;* 2, *s.-n.-n.-levu;* 3, *vulai-mbotambota;* 4, *v.-kelikeli;* 5, *v.-were-were;* 6, *kawakatangare;* 7, *kawawaka-lailai;* 8, *k.-levu;* 9, *mbalolo-lailai;* 10, *m.-levu;* 11, *nunga-lailai;* 12, *n.-levu* [3]. The names are not explained, but from the glossary [4] we learn that *vula* means 'moon' and 'month', *se-ni-ngasau* 'flower of the reed', *mbota* 'to share out, distribute', *keli* 'to dig', *were* 'to till the ground', *kawa* 'offspring, posterity', *waka* 'root', *nunga* is the name of a fish, *mbalolo* is the familiar palolo, which is a favourite delicacy all over Polynesia, *levu* = 'big', *lailai* = 'little'. In so far as the meaning of the names is to be perceived, therefore, they relate to the business of agriculture and fishing. Here also we meet the already familiar phenomenon in which several months have the same name, and are distinguished by the addition of 'big' and 'little'.

For the Polynesians many series of months are reported: some of these have 13, others 12 months. The Maoris of New Zealand count 13, and are distinguished from all others in only numbering, not naming, the first ten. According to H. Williams the months are counted from the beginning of the *kumara*-planting, and are only denoted by numbers; in the tenth month the harvest takes place, and also the feast of the dead, *hahunga,* which for this reason also serves as a designation of

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[1] Christians, .p. 393, after Kubary. [2] Kubary, pp. 107 ff. [3] Hale, p. 68. [4] *Ibid.,* pp. 391 ff.

the year, but after that no further months are counted, up to the first [1]. This last statement must be regarded with suspicion, since other sources give not indeed numbers but names for the last three months and the points of reference. As an example of the nomenclature I give *marama-to-ke-ngahuru,* 'the tenth month'. The eleventh has the same name with the addition of *hauhake kumare,* to dig up, harvest *kumara*; the twelfth and thirteenth are called respectively *ko-te-paengwawa* and *ko-te-tahi-o-pipiri,* which names are unfortunately not translated. *Pipiri* recurs as the name of a month in the Society Islands and Tahiti; there it is said that the name refers to a certain thriftiness or stinginess, perhaps in the supply of fruit [2]. But the numbering of the names of the New Zealand months is certainly a later phenomenon, since the cognate tribes everywhere have proper names, nor do the months on this account lose their connexion with the phenomena of Nature. Although they were not named from the latter, they were regulated by them. Each moon is distinguished by the rising of stars, the flowering of certain plants, the arrival of migratory birds, etc. I give a list of these points of reference, beginning at June: unfortunately the names of stars are not identified by our authority. 1, *puanga,* the great winter star, rises early in the morning, and also denotes the beginning of winter: *matariki, tapuapua, wakaahu te ra o tainu* are also in the ascendant; 2, *wakaau, waakaahu nuku, w. rangi, w. papa, w. kerekere, kopu, tautoru;* 3, *taka-pou-poto, mangere, kaiwaka,* spring begins, the *karaka* and *hou* flower; 4, *taka-pou-tawahi,* it begins to be warm, cultivation commences, the *kowai, kotuku tuku,* and *rangiora* trees flower, a rainy month; 5, *kumara* is planted, the *tawera* is ripe, the cuckoo, *koekoea,* arrives, the windy month, corresponding with our March, hence the name *te rakihi,* the noisy or windy period; 6, *te wakumu,* the *rewarewa* flowers; 7, *nga tapuae,* the *rata* flowers; 8, *uruao rangawhenua, rehu* is the great summer star, the star *rangewhenua,* an ancestor, is said to rule the days, and *uruao* the nights of this month, the *karaka* flowers; 9, *rehua, ko ruruau,*

[1] Meineke, p. 105. [2] Cp. pp. 212, 213.

the dry and scarce month; 10, *rehua, matiti* (indicates the autumn), *ngahuru,* the harvest month for the *kumara*; 11, *te kahui-rua-mahu,* the days grow cold, the cuckoo leaves; 12, *kai waka, patu-tahi matariki,* the winter-star *koero* is the chief star of this month; 13, *tahi ngungu,* the grumbling month, little food, bad weather, smoky houses, watery eyes, constant quarrels [1]. There are some descriptions of the months which also seem to be their names. Taylor's statement that the twelfth month often passes unnoticed deserves attention.

Of Tonga it is noted that the names of the months are scarcely known to any except those who work on the plantations: the order of their succession is not quite clear. The months are often grouped in pairs, *mooa* meaning the first, *mooi* the second. 1, *liha-mooa,* 2, *l.-mooi, liha* means 'nit', but is not connected by the author with the name of the month; 3, *vy-mooa,* 4, *vy-mooi, vy* = 'watery', 'rainy'; 5, *hilinga gele-gele: hilinga* is said to be a corruption of *hilianga,* 'end, termination', *gele-gele* = 'dig', because in this month they cease digging the ground for planting yams; 6, *tanoo manga, tanoo* = 'to overwhelm, to bury', *manga* = anything open, diverging, fork-shaped; 7, *oolooenga;* 8, *hilinga mea,* 'the end of things', the month in which the principal agricultural work of the season is finished; 9, *fucca afoo moooi, moooi* = 'to live, recover'; 10, *fucca afoo mote, mote* = 'to die, wither'; 11, *oolooagi mote, oolooagi* = 'the first'; 12, *fooa feuke anga*; 13, *mahina tow, mahina* = 'moon', *tow* = the end of anything [2]. On the Society Islands the people were not unanimous as to the beginning of the year, nor as to the names of the months, each island having a computation peculiar to itself. The series of months adopted by King Pomare and the reigning family was: — 1, *avarehu,* the new moon that appears about the summer (viz. our winter) solstice at Tahiti; 2, *faaahu,* the season of plenty; 3, *pipiri*; 4, *taaoa,* the season of scarcity begins; 5, *aununu;* 6, *apaapa;* 7, *paroro mua*; 8, *paroro muri*; 9, *mu-*

[1] Thomson, I, 198, Taylor, p. 362. The list is Taylor's: Thomson's is not so full, and is distinguished from the other in assigning a later position to the phases of the vegetation; it must therefore come from a more southerly district. [2] Martin, II, Vocabulary, s. v. *mahina,* 'moon, month'.

riaha; 10, *hiaia;* 11, *tema,* the season of scarcity ends; 12, *te-eri,* the young bread-fruit begins to flower; 13, *te-tai,* the bread-fruit is nearly ripe. Another computation commenced the year at the month *apaapa,* about the middle of May, and gave different names to several of the months [1]. Another older list gives the following series from Tahiti: — 1, *o-porori-o-mua,* March, the first hunger or scarcity; 2, *o-porori-o-muri,* 'the last scarcity', which agrees to some extent with the facts, since the bread-fruit is scarcest just when it is ripening, as at that time it is used for *mahei,* sour dough; 3, *mureha;* 4, *uhi-eya,* has certainly a reference to catching fish with a hook; 5, *hurri-ama;* 6, *tauwa;* 7, *hurri-erre-erre;* 8, *o-te-ari,* probably so called from the young cocoa-nuts, which just then are very numerous; 9, *o-te-tai,* contains an allusion to the sea; 10, *wa-rehu;* 11, *wä-ahau,* refers to the cloth made from the mulberry bark; 12, *pipirri,* refers to a certain thriftiness or stinginess, perhaps in the supply of fruit; 13, *e-u-nunu* [2]. For the Marquesas Islands (Futuhiwa) I know only a bare enumeration of 13 names of months [3].

For Samoa there is more information. I give von Bülow's list: — 1 (Oct.—Nov.), *palolo* or *taumafa mua,* 'there is for the first time abundance for all': bananas, bread-fruit, and taro are ripe, the month provides much fish; 2, *toe taumafa,* 'there is once more abundance', the harvest is still not ended; 3, *utuvamua,* 'it is uninterrupted', new crops of other fruit have not yet appeared; 4, *toe utuva,* 'still uninterrupted'; 5, *faaafu,* 'the leaves of the yam plant get dry', i. e. the root is ripe; 6, *lo,* 'the staff for the harvest of the bread-fruit', sc. 'is brought into play'; 7, *aununu,* 'the making of the arrowroot into starch', the root is now ripe; 8, *oloumanu,* 'the cage of the birds' (is prepared), in which to tame the wild pigeons caught in nets, after some of their wing-feathers have been removed; 9, *palolo-mua,* the first palolo fishing: the appearance of the palolo formerly took place in various months, since there are still islands in which palolo is found in the last quarter of every month; 10, *toe palolo* or *palolomoli,* 'repeated last palolo

[1] Ellis, *Polyn. Res.*[3], I, 86. [2] Forster, pp. 438 ff. [3] Fornander, I, 125.

fishing', from the fishing at the end of the year in October or the end of September, according to the island; 11, *mulifa,* 'the banana-pole' (is hewn down), i. e. the bananas are ripe; 12, *lotuaga,* 'the *lo* is laid to rest', i. e. the bread-fruit harvest is over [1]. All the lists agree in giving only twelve months: the seasons are two in number. For the Bowditch Island a list of twelve names is given without explanation; the names are in a great measure the same as the Samoan. The author adds: — It seems as though *vainoa,* month no. 9, is the leap-month, but there was no name for the eleventh month, corresponding to our March [2].

For the Sandwich Islands abundant material exists, more particularly in the work of the native writer, Malo. I give the list commonly found in other authors also [3], together with the explanations which Malo has obtained from old Hawaiians well versed in the calendar, in the first place those of O. K. Kapule of Kaluaha, Molokai, and secondly, in the case of some months, those of Kaunamoa, of whose dwelling-place we are told nothing more than that he was a Hawaiian. 1, *ikuwa* (January), so named from the frequent occurrence of thunder-storms, *wa-wa,* 'to reverberate, to stun the ear': the noisy month, clamor of ocean, thunder, storm; 2, *huna-ia-eleele,* from the frequent overcasting and darkening *(eleele)* of the heavens; 3, *welo,* because the rays of the sun then begin to shoot forth *(welo)* more vigorously: the leaves are torn to shreds by the *enuhe*, a kind of worm; 4, *makalii* (the Pleiades); 5, *ka-elo,* so named because the sweet potatoes burst out of the hill, or overflowed the basket; 6, *kau-lua,* from the coupling together of two canoes *(kau-lua):* the two stars called *kau-lua* then rose in the east; 7, *nana,* from the fact that a canoe then floated *(nana, lana)* quietly on the calm sea: the young birds then stir and rustle about *(nana-na)* in their nests and coverts ; 8, *ikiiki,* the hot month (*ikiki*

[1] von Bülow, *Globus, 72* p. 239; G. Turner, *A hundred years ago and long before,* London, 1884, makes the same statement, Krämer (I, 356) differs very little from it; cp. also Hale, pp. 169 ff. A quite different list is to be found in a work inaccessible to me — Pratt and Frazer, *Some Folk-songs and Myths from Samoa,* R. Soc. of New S. Wales, XXIII, 1891, p. 121. It is worth noting that here two names of months are said to mean a demon, another a forest spirit. [2] Lister, p. 53. [3] Dibble, pp. 24 ff; Fornander, I, 119.

or *ikiiki,* 'hot and stuffy'): 'hot and sticky', from being shut up indoors, by weather; 9, *kaa-ona,* because then the sand-banks begin to shift in the ocean, *ona* is said to be another word for *one,* 'sand': (dry) sugar-canes, flower-stalks, etc., which have been put away in the top of the house, have now become very dry; 10, *hili-na-ehu,* from the mists that floated up from the sea; 11, *hili-na-ma,* because it was necessary to keep the canoes well lashed *(hili);* 12, *welehu,* so named from the abundance of ashes *(lehu)* that were to be found in the fire-places at this time. Malo gives six other lists, two for Hawaii, one each for Molakai, Oahu, Kauai, and Maui. The differences in the order of the months already mentioned are sometimes great, and some new names occur. The former circumstance is doubtless to be explained by the fact that under European influence the native months early passed out of use and were forgotten, and the right order has not been certainly retained in the memory. Some of these explanations are obvious improvisations, in some cases one of the two explanations manifestly shews itself to be the correct one. This proves that the names of the months are so old that the original meaning has been lost. The forgetting of the native months is also responsible for the insufficiency of the information for other islands. Malayan philology might perhaps be able to go farther, if it took up the matter. But where the meaning is clear, it everywhere has reference to the seasons, their occupations and climatic conditions, and to the stars; the Polynesian names of months are in no way different from those of all other primitive or barbaric peoples.

The conclusion to be drawn from our investigation of the names and series of the months is therefore the following. In order that the month may be distinguished from others it is named after an occupation or natural phase which takes place while the month lasts, being described commonly by means of the addition 'moon of the —', but not seldom simply by the name of the natural phase or the occupation respectively. Any natural phase or occupation can originally give its name to a month, and hence arises an indefinite number of such terms. When any period of the year is without im-

portant natural phases and occupations, the months in this period are not named. At first, therefore, the names of the months are of an occasional, incidental character: the orientation of them follows from the general acquaintance with the phases and occupations of the natural year. As the result of a gradual selection in the daily usage of the names a less unstable, and in the end quite fixed, series of months is formed, which on account of the length of the natural year must comprise 12 to 13 months. The result is a difficulty which formerly was not felt, owing to the fluctuating character of the names of months, for the natural phases and the moons are pushed out of their mutual relationship, and this naturally leads to the question how many months the year includes, i. e. to the necessity of the intercalation. For the moon-month, which begins with the new moon, is a natural unity, which cannot be broken up.

CHAPTER VII.

CONCLUSIONS.

Whoever has had patience to read through the material collected in the previous chapter will now no doubt be clear as to the process by which the cycle of months arose. The necessity was felt of distinguishing the months, of marking them. After the fashion of primitive man this was done, not by means of an abstract enumeration, but by some concrete reference. But the relation to a solitary historical event, by which rather more highly civilised peoples denote the years, can hardly, or only in isolated instances, be applied to the month: for the life of primitive peoples is very monotonous, and is not so rich in events which make an impression upon the mind that one of these will occur in every month, and even supposing that such events could be found, the months in a human life are too numerous for it to be possible to keep a series of this nature in mind. A second circumstance also proved decisive. The moon, whose phases always recur with regularity, served better than anything else to determine the date of any future event within a shorter period. The primitive peoples, with their undeveloped faculty of counting, could in this fashion numerically determine only a couple of months before or after the time of the moon that was then visible in the heavens. This is what we must understand by the statement made for the western tribe of the Torres Straits, viz. that they had no division of the year into months or days and never numbered the years, in view of the following statement that they commonly counted time in 'suns', i. e. days, and 'moons', i. e. months[1]. That is, they numbered two or three months, but had no series of months.

[1] Haddon, p. 303; so also *R. T. Str.*, p. 225.

The same initial stage is found also on the Australian continent. The natives of Central Australia reckon time by moon-phases, moons, and in the case of a longer period by seasons [1]. The Kakadu of Northern Territory reckon in moons and seasons, otherwise everything is more or less vague with the exception of the present and the immediate past and future [2].

Primitive man does not get very far in this fashion. In accordance with his custom and his whole habits of thought he must have some concrete factor to enable him to conceive of the different moons. This is found in the fact that the moon covers a part of the natural year. Herein lies a connexion which constantly recurs. The moons were therefore distinguished and named with reference to the phenomena of the natural year, to the phases of nature and to the occupations, labours, and conditions determined by them, and further to the risings of the stars. Within the series of from twelve to thirteen moons the month was determined by these means. Or, expressed somewhat differently, seasons and moons were mutually connected.

Originally this grouping together of the months was only incidental. The original state of affairs is well illustrated by the detailed description given by Codrington for the Melanesians: —

"It is impossible to fit the native succession of moons into a solar year, months have their names from what is done and what happens when the moon appears and while it lasts; the same moon has different names. If all the names of moons in use in one language were set in order the periods of time would overlap, and the native year would be artificially made up of 20 or 30 months. The moons and seasons of Mota in the Banks' Islands may serve as an example. The garden work of the year is the principal guide to the arrangement, the succession of 1, clearing garden ground, *uma,* 2, cutting down the trees, *tara,* 3, turning over and piling up the stuff, *rakasag,* 4, burning it, *sing,* 5, digging the holes for yams, *nur,* and planting, *riv.* Then follows the care of the yam plants till the harvest, after which preparation for the next

[1] Spencer and Gillen, *Centr. Austr.*, p. 25. [2] Spencer, p. 444.

crop begins again. At the same time the regular winds and calms are observed, the spring of grass, the conspicuous flowering of certain trees, the bursting into leaf of the few deciduous trees. When a certain grass, *magoto,* springs, the winter, as it must be called, is over; when the erythrina, *rara,* is in flower, it is the cool season; *magoto,* therefore, and *rara* are names of seasons in native use, and answer roughly to summer and winter. The strange and exciting appearance of the palolo, *un,* sets a wide mark on the seasons. The April moon coincides pretty well with the time of the *magoto qaro,* the fresh grass; clearing, *uma,* of gardens goes on, the trade wind is steady. This is followed by the *magoto rango,* the withered grass; both are months of cutting down trees in the gardens, *vule taratara,* and in the latter the stuff is burnt. In July the erythrina, *rara,* begins to flower; this is *nago rara,* the face of winter; gardens are fenced, it is a moon of planting yams, *vule vutvut.* Planting continues into August, when the erythrina is in full flower, *tur rara,* the *gaviga,* Malay apple, flowering at the same time; the S. E. wind, *gauna,* blows, the yams begin to shoot and are stuck with reeds. In the next month the erythrina puts out its leaves, it is the end of it, *kere rara;* the yam vines run up the reeds and are trained, *taur,* upon them; the reeds are broken and bent over, *ruqa,* to let them run freely; the ground is kept clear of weeds; the tendrils curl, and the tubers are well formed. Then come the months of calm, when three moons are named from the *un,* palolo: first the *un rig,* the little *un,* or the bitter, *un gogona,* when at the full moon a few of the annelids appear. It is now the *tau matua,* the season of maturity; yams can be taken up and eaten, and if the weather is favourable, a second crop is planted. The *un lava,* the great palolo, follows, when at the full moon for one night the annelids appear on the reefs in swarms; the whole population is on the beach, taking up the *un* in every vessel and with every contrivance. This is the moon of the yam harvest; the vines are cut, *goro,* and the tubers very carefully taken up with digging-sticks to be stored. A few *un* appear at the next moon, the *werei,* which may be translated 'the rump, of the *un*'. In this moon they begin again

to *uma,* clear the gardens; the wind blows again from the west, the *ganoi,* over Vanua Lava. It is now November or December, the *togalau*-wind blows from the north-west, it is exceedingly hot, fish die in the shallow pools, the reeds shoot up into flower; it is the moon of shooting up, *vule wotgoro.* The next month is the *vusiaru,* the wind beats upon the *casuarina*-trees upon the cliffs, the next again is called *tetemavuru,* the wind blows hard and drives off flying fragments from the seeded reeds; these are hurricane months. The last in order is the month that beats and rattles, *lamasag noronoro,* the dry reeds; the wind blows strong and steady, work is begun again, they *rakasag,* dry the rubbish of their clearings, and make ready the fences for new gardens. By this time the heat is past, the grass begins to spring again, and the winter months return." [1].

According to another report the natives of New Britain (Bismarck Archipelago) are still at the initial stage of the development. They numbered the months of the monsoons, five for each, and gave one month each to the two intervening periods. They had no names for each month, but only for the season. However they had terms for the planting and for the digging-moon, i. e. the harvest [2].

Another example may serve to shew how near to one another lists of months and seasons may under certain circumstances come. The Chukchee divide the year into twelve lunar months or 'moons'. The year begins with the winter solstice, the time of which is marked pretty accurately. The dark interval between two moons is called 'moon interval'. The names are: — 1, the old-buck month; 2, cold udder (month); 3, genuine udder (month); 4, calving month; 5, water (month); 6, making-leaves month; 7, warm month, or summer month; 8, rubbing-off velvet (antlers) month, or midsummer month; 9, light-frost month; 10, autumn month, or wild-reindeer rutting month; 11, unexplained, perhaps 'muscles of the back', since it is believed that the muscles in the back of the reindeer become stronger in winter: also called 'new-snow cover'; 12, shrinking (days) month. The Koryak have different names in different

[1] Codrington, pp. 349 ff. [2] Brown, pp. 331 ff.

localities, but most of them call the third and the fourth months respectively the 'false' and the 'true reindeer-birth month'. In ordinary speech, however, the names of months often give place to names of seasons, which are far more numerous than among us. Those most commonly used are: — 1, 'in the extending', sc. of the days, corresponds approximately to the first month of the year; 2, 'in the lengthening', corresponds to the second month; 3' 'during (the days) growing long', lasts about six weeks, until the reindeer begin to calve; 4, 'in the calving-(time)'; 5, 'in the new summer growing'; 6, 'in the first summer'; 7, 'in the second summer'; 8, 'in the middle summer'; 9, 'with the fresh air going out'; 10, 'with the first light frost'; 11, 'with the new snow'; 12, 'in the fall'; 13, 'in the winter' [1]. Certainly these are seasons, and one of them has six weeks, but our authority himself explains a couple of them by a comparison with the moon-month. There are just thirteen of them, which, if the number is more than an accident, is an accurate series of months. In every case the addition of the word 'moon' would make the names descriptive of a month. The names in both the lists just given are of a similar nature.

Few travellers and scholars have been so unfettered and unprejudiced by our inherited ideas of the calendar as Codrington; accordingly they have usually striven to establish a proper series of months, or at least normal series. How much is lost to view owing to this tendency can hardly be imagined, but there are sufficient indications in the reports to point to the fluctuating, manifold, and unstable nature of the primitive naming of the months.

One of these indications is the great variability of the names. Many peoples have remained at the stage at which a fixed connexion between month and season does not exist: every season — taking the word in its broadest sense —, every natural event and occupation may be associated with a month. If these relationships are treated as names of months, there will arise a great number of names of months, which will vary according to circumstances and to the whim of the speaker. Thus it is said [2] of the Eskimos of the Behring Straits that

[1] Bogoras, I, 51 ff. [2] Above, p. 182.

very often different names are used to describe the same month, when this month occurs at a time at which different occupations or natural phenomena are in progress. That the situation is, or at least was, the same among most peoples is shewn by the numerous variants which are to be found even in the preceding lists, and would certainly be much more numerous if the authorities, in their efforts to establish a normal series, had not passed them over. In the same fashion is to be explained the next surprising phenomenon, viz. that certain peoples, in the matter of the number of months in the year, give a far greater number than twelve or thirteen. This is not always to be set down to the inability to count. That explanation serves when prominent Igorot declare that the year has a hundred months [1], but not when the Kiowa number 14 or 15 [2]. The Hopi year too may have 14 months, since the second part of October receives a special name [3]. Perhaps the month is halved, just as when among the Central Eskimos the days of a certain month, which has only twilight and no sun, receive one name, and the rest of the month another [4]. A traveller of the 18th century states that the Tahitians reckon 14 months, and adds that it is a mystery how they count them [5]. But these traces are here seen to be relics of an earlier state of affairs such as Codrington has clearly described: — "Months have their names from what is done and what happens when the moon appears and while it lasts; the same moon has different names. If all the names of moons in use in one language were set in order, the periods of time would overlap, and the native year would be artificially made up of 20 or 30 months".

This fluctuating character of the nomenclature explains the instability of the names of the months; when anything new happens which is of importance for the life of the people, it serves to describe a month. Thus the Lenope, after they migrated inland, where no shads were found, renamed the shad-month the sugar-refining month [6]; and the Pima, after they had learnt to cultivate wheat, named a month from the wheat harvest [7].

[1] Jenks, p. 219. [2] Mooney, *Kiowa*, p. 368. [3] Above, p. 193. [4] Above, p. 183. [5] Forster, p. 371. [6] Above, p. 190. [7] Above, p. 195.

The best evidence is the multiplicity and diversity of the names of months, which is found everywhere, even among the most closely related peoples and tribes, or different groups of the same tribe, as is shewn by the above series of months from beginning to end. Most significant and by no means isolated is the case of the Cheyenne, different groups of whom have separate names for the months. Since they are well acquainted with the customs of the animals and roam over wide areas, they easily recognise any name for a month, even if they themselves do not use it. The reason for this is also that the seasons, which serve as descriptions of the months, are common to all and at once become intelligible [1]. They have not been fixed in a conventional series, as is the case with the months as we conceive them; ours is the final point of the development, which begins with a chaotic mass of names of months.

We see that at this stage the number of months is indifferent: the question how many months the year has simply does not exist, and consequently there is no need to make the series of moon-months fit into the solar year. There are peoples who do not even extend the reckoning by moons to the whole year. There is a time 'in which nothing happens', which is quite without interest and in which no one takes the trouble to observe or name the moons. Such a period is e. g. the depth of winter in the far north, when people only vegetate, as well as they can. Among the tribes of the Kamchatka river the tenth and last month is said to be as long as three others [2] The Amansi, one of the Ibo-speaking tribes, reckon ten months and an *evulevu* (idiot, nothing, empty month) [3]. More often we find series of months with less than twelve names. The inhabitants of the Marquesas Islands had a ten-month year, although as well as this they knew the complete year, which was reckoned and named according to the Pleiades [4]. Even the Maoris are said to have counted no more months after the tenth [5]. The Yurak Samoyedes and the Tunguses of the Amur count only eleven months, the northern Kamchadales ten [6].

[1] Above, p. 192. [2] Above, p. 180. [3] Thomas, *Ibo*, I, 127. [4] Mathias G., p. 211. [5] Above, pp. 210 f. [6] Above, pp. 178, 180.

The Yeneseisk Ostiaks name only the months of one half of the year, the seven winter months [1], and so do many Indian tribes. The Bannock have no names for the months of the warm season of the year [2]. Many Cheyenne tribes have only six months with names [3]; the present condition of the calendar of the Hopi and Zuñi points to the fact that this was really the case with these tribes also [4]. The Diegueño of S. California have only six months [5]. Even where a full series of months has arisen, there are traces of this earlier state of affairs. Thus the Omaha have one month 'in which nothing happens' [6]. Of the 13 months of the Upper Wellé those occupying the 7th and 13th positions have no names [7]. Among the Voguls of the Tawda three months seem to be unnamed [8].

A further very wide-spread phenomenon of the nomenclature of the months — the pairs of months, in which two months of the same name are distinguished as the big and the little, the former and the latter, etc. — is due to the connecting of the month with somewhat larger divisions of the natural year, covering a period of about two months. Thus the Tchuvashes have a very steep month and a month of little steepness, the Ugric Ostiaks a big and a little winter-ridge month, the Minusinsk Tatars a little and a big cold, the Karagasses a frost month and a big frost month, the Samoyedes a first and a big dark month, the Voguls a little and a big autumn-hunting month, perhaps also a little and a big midsummer month, the Thlinkits a month before, and a month when, everything hatches, the Indians in De la Potherie a first and a second moon in which the bear brings forth her young, the Kiowa a little bud-moon and a bud-moon, the latter sometimes with 'big' added, the Creek Indians a little and a big ripening moon, a little and a big chestnut moon, a big and a little winter, the latter also called 'little brother of big winter' (note the inverted order in this case), a little and a big spring. The Seminole have four pairs of months, in three the first is distinguished as the little, e. g. little and big mulberry moon, but on the other hand the big winter precedes

[1] Above, p. 176. [2] Above, pp. 193 f. [3] Above, p. 192. [4] Above, p. 195. [5] *Du*bois, p. 165. [6] Above, p. 193. [7] Above, p. 200. [8] Above, p. 174.

the little; the Zuñi have a little and a big wind-month. Somewhat similar are the pairs of months of the Pima, 'leaves' and 'flowers' of the cottonwood and mesquite respectively. The Nandi of British East Africa have two pairs, 'sacrifice' and 'second sacrifice', 'strong wind' and 'second strong wind'. Compare also the two Basuto months *phupjoane,* 'to begin to swell', from *phuphu,* and *phuphu,* 'to swell'. The two series of months from Timor shew more pairs. In the Polynesian series pairs of months are equally frequent. In Tonga there are two pairs, including a first and a second rainy month, on the Society Islands there is a first and a second palolo month, and so also in Samoa, in Tahiti a first and a last hunger. How the pair so frequently occurring among the Siberian peoples, little and big month, is to be explained is uncertain (cp. among the Thlinkits 'moon-child' or young month, and big month). It may be that something is to be understood, or perhaps they are simply two months without names, which are distinguished by the aid of the common epithets.

Such pairs of months exist where greater seasons are involved in the determining of the moons, and they are in fact convenient, since their use obviates the unfortunate circumstance which has been a source of great confusion to primitive peoples, viz. that a natural phase from which it is the custom to name a month may fall on the border-line between two moons. So long as the description of the months remains quite fluctuating and occasional, this and similar inconveniences do not make themselves felt, but a very natural development leads to a conventionalising of the series of months. In common speech a selection among the various names of months unconsciously takes place, so that those prevail which relate to more important occupations and natural phases. Thus arises a fixed, or tolerably well fixed, series of months, such as appears in most of the reports handed down to us.

CHAPTER VIII.

OLD SEMITIC MONTHS.

1. BABYLONIA.

In the much disputed questions of the ancient Babylonian astronomy and calendar the non-expert is in a situation of despair: for whoever cannot himself make use of the sources is referred to the often directly contradictory statements of the experts. I cannot however shirk the task of investigating whether in Babylonian calendric systems traces of the primitive time-reckoning are not also to be found. Unfortunately I cannot limit myself to matters upon which a certain unity of opinion prevails, but must also touch upon burning questions, such as the intercalation. What is here offered is in the nature of things only an attempt: but I may perhaps be allowed to express the hope that competent specialists, not led astray by chronological hypotheses, may afterwards observe how far the few but obvious characteristics of the primitive time-reckoning recur also in the Babylonian system.

The multiplicity and variability of the names of the months are found once more in ancient Sumer. In so comparatively late a period as the kingdom of Ur (in the middle of the second half of the third millenium B. C.) each minor state had its own list of months, which I here reproduce, together with the suggested explanations, chiefly from the latest work of Landsberger [1]. At this time there was in use in Nippur a list of months the terms of which later served as general ideograms for the months. The names are: — 1, *bar-zag-gar(-ra)*, month

[1] The explanations given by Muss-Arnolt are known to me only through Ginzel, I, 117 ff.

of habitation or inhabitants of the sanctuary; 2, *gu(d)-si-sa,* the name is derived by the Babylonians themselves from an agricultural occupation, the driving of the irrigating-machine drawn by oxen: the moderns connect this name with the *gu(d)-si-su* festival celebrated in this month at Nippur; 3, *šeg-ga,* shortened from *šeg-u-šub-ba-gar-ra,* 'month in which the brick is laid in the mould'; 4, *šu-kul-na,* probably 'sowing-month', although the time does not fit: for displacements see below p. 261; 5, *ne-ne-gar(-ra),* named from a festival; 6, *kin-^{d}Inanna,* named from an Istar festival; 7, *du(l)-azag(-ga),* from a festival; 8, *apin-du-a,* 'month of the opening of the irrigation-pipes', which fits very well with the time of year; 9, *kan-kan-na,* probably 'ploughing-month', which also agrees very well with the season; 10, *ab(-ba)-e(-a),* from a festival; 11, *aš-a(-an),* 'month of the spelt'; 12, *še-kin-kud-(du),* 'month of the corn-harvest'. There are therefore some names of the familiar kind, taken from agricultural occupations, but more are borrowed from festivals. It is very natural that the list of months should be regulated by ecclesiastical points of view, since Nippur was a great and very ancient centre of the religious cult.

Most interesting are the months from Girsu (Lagash). From the pre-Sargonic period about 25 names of months have hitherto been found, of which only 8 or 9 persisted up to the second and third periods. These 25 names of months are divided by Landsberger into the following groups: — (1) occasional names of months, under which he includes those which are consciously named after the object or employment mentioned in the document itself, or even improvised from the domestic occupation in question. Four names are given but are not translated. (2) isolated and foreign names of months: 'month in which the shining (or white) star sinks down from the culmination-point', a type familiar to us; 'month in which the third people came from Uruk', doubtless an accidental description. Further, two months named from festivals at Lagash. (3) agricultural by-names: *itu še-kin-kud-du,* see above; *itu gur-dub-ba-a,* 'month in which the granary is covered with grain'; further a name not explained, perhaps identical with the foregoing. (4) terms belonging to the religious cult.

Of these no fewer than 17 exist, not counting those already mentioned: they are nearly all named after festivals. Great pains have been taken to arrange the months in their position in the calendar, and the superfluous names have been set down merely as doublets, since they have been judged by the lists of months current among ourselves. When we compare the terms with those of the primitive time-reckoning, it becomes clear that the naming of the months is here in the same fluctuating state as e. g. among the Melanesians. According to circumstances, an agricultural occupation, the rising of a star, a festival, etc. is seized upon in order to describe the month. Certainly the months can be chronologically arranged, but to draw up a fixed series from these 25 names is impossible, even if tendencies towards the formation of such a series already exist. The development tends in this direction in order to facilitate a general understanding, and in the second period, at the time of the kingdom of Akkad in the 28th to 26th centuries, a list of this nature occurs [1]: — 1, *itu ezen ganmaš,* perhaps 'month of the reckoning', i. e. of the profits of the agriculture, or *'mois où la campagne resplendit'*; 2, *itu ezen har-ra-ne-sar-sar,* 'month in which the oxen work'; 3, *itu ezen dingir ne-šu,* of uncertain meaning but connected with the cult; 4, *itu šu-kul,* see above; 5, *itu ezen dim-ku,* month of the feast in which the *dim* consecrated to the deity was eaten; 6, *itu ezen* ^{dingir} *Dumu-zi,* month of the Tammuz feast; 7, *itu ur;* 8, *itu ezen* ^{dingir} *Bau,* month of the feast of the goddess Bau; 9, *itu mu-šu-gab,* meaning uncertain; 10, *itu mes-en-du-še-a-na* (?); 11, *itu ezen amar-a(-a)-si, amar* = 'young brood', *a* = 'water', *si* = *malu* = 'to be full', and therefore probably 'spawning month'; 12, *itu še-še-kin-a,* another form for *še-kin-kud;* 13, *itu ezen še-illa, 'mois où le blé monte',* according to Radau 'grain grow(n)', according to de Genouillac, whom Kugler follows, *'mois où on lève le blé pour les moutons'*: i. e. after the corn has been trodden out on the threshing-floor by the oxen, the stalks are taken up for the cattle. The list has therefore thirteen months. Further, two points are to be noted.

[1] The respective explanations are from Kugler, II: 1, pp. 176 ff., and Thureau-Dangin.

In the first place only eight months (nos. 1, 2, 3, 5, 8, 11, 12, and 13), or perhaps nine — if *itu ur* is to be regarded as an abbreviation of *itu ga-udu-ur-(ra-)ka* — are taken over from the preceding period. The multiplicity and instability of the names of months were therefore at an earlier period still greater than the known names indicate. In the second place the word *ezen*, 'feast', is a secondary addition to the names of the 2nd, 3rd, 13th, and probably the 4th months, that is to say, the ecclesiastical point of view has penetrated into the nomenclature of the months to such an extent that even months with names borrowed from agricultural occupations are explained anew by festivals. The third period is the time of Dungi and his successors. The list of months differs only in that 7, *itu ur*, was re-named as *itu ezen* ^{dingir} *Dungi*, and the tenth month of the above list is missing, so that we have 10, *itu amar-a-asi*; 11, *itu še-kin-kud*; 12, *itu se-illa*; in the intercalation 11 is doubled, *itu dir še-kin-kud*. The seventh month takes its name from a festival celebrated in honour of the deified king Dungi; it is therefore the oldest example of a naming of a month from deified rulers which originates in the festivals bound up with the cult; such names are familiar from the Graeco-Roman period and examples still survive in the words 'July' and 'August'. Still another version of this list exists in the so-called syllabar of months, in which six series of names of months are enumerated. This list is not completely preserved. The most considerable deviation is that only two months instead of three intervene between the months *šu-kul-na* and *ezen* ^{d} *Bau*: the order of succession is therefore broken. Landsberger conjectures that we have to do either with a later form of the calendar from Lagash, at the time of the kings of Larsa and Isin — afterwards the Nippur list was used, this being employed everywhere, at least ideographically — or else with a local offshoot. In any case the list affords valuable evidence of the instability of the months.

In modern Drehem there is found a list of months in which each month is allotted to an official of the cult, so that the result is a monthly regulation of the cult. The list is assigned to the town of Ur. 1, *maš-da-ku*, 'month of the gazelle eating',

from a festival ceremony; 2, *šeš-da-ku,* and 3, *u-bi-ku,* borrowed from religious festivals; 4, *ki-sig* ^{d} *Nin-a-zu,* month of the mourning festival of Ninazu; 5, *ezen* ^{d} *Nin-a-zu,* month of the (joyful) festival of Ninazu; 6, *a-ki-ti,* named from a feast; 7, *ezen* ^{d} *Dungi,* see above; 8, *šu-eš-ša,* unexplained, later ousted by ^{itu} *ezen* ^{d} *Su-* ^{d} *Sin;* 9, *ezen-mah,* 'month of the high feast'; 10, *ezen-an-na,* month of the Anu feast; 11, *ezen Me-ki-gal,* doubled in intercalation; 12, *še-kin-kud.* There are also many variants. The names, with the exception of that of the old harvest month, are all taken from feasts: the ecclesiastical nomenclature has therefore been carried out very fully.

The list of months from Umma: — The months 1, 2, and 6 are borrowed from the Nippur list. Of undoubted religious origin are: — 9, ^{d} *Ne-gun;* 10, *ezen* ^{d} *Dungi;* 12, ^{d} *Dumu-zi.* 11 has the variant $^{itu\ d}$ *Pap-u-e.* To none of the four local systems can ^{itu} *azag-šim* be allotted.

A fifth list is known only from the above-mentioned syllabar, and is not certainly localised. The names of months refer to festivals and religious ceremonies, and have not all been completely preserved.

We have seen what a multiplicity prevails among the Sumerian names of months. At the time of the dynasty of Hammurabi the signs of the Nippur list are used as ideographic signs of the months. The phonetic readings are known. The names are the common ones which were also adopted by the Jews in exile. The explanations are, according to Muss-Arnolt: — 1, *nisanu,* from *nesu* = 'to stir, to move on, to leap'; 2, *airu,* from *aru,* 'bright', or *'ir,* 'to send out, to sprout', and therefore the month of blossoming and sprouting; 3, *sivanu;* 4, *duzu,* 'son of life'; 5, *abu,* 'hostile' (on account of the heat); 6, *ululu;* 7, *tašritu,* 'origin, beginning'; 8, *arah-samna,* 'the eighth month'; 9, *kislivu;* 10, *dhabitu,* 'the gloomy month'; 11, *sabadhu,* 'the destroyer'; 12, *addaru,* 'the dark (month)'. The names are therefore borrowed throughout from natural phenomena. Numerous phonetic writings in legal documents are alone sufficient to shew that, at least for Sippar, our common pronunciations of the month-ideograms of this time were not the only ones in use. Landsberger gives 12 other names, of which only

a few can be explained. *Sibutim, sibutu* is the name for the 7th day and its festival, as the name of a month therefore, carrying over the idea to the year, it is the *sibutu* of the year; *ki-nu-ni,* 'oven month', because the oven must then be heated; *arah ka-ti-ir-si-tim,* 'hand of the underworld', probably something like 'month of epidemics'. One or two are named from gods. Therefore among the Semites of Babylonia also a fixed series of months was formed only gradually, by selection, and indeed under the influence of the Sumerian calendar from which the ideograms were borrowed.

The Elamite calendar is known partly from the so-called syllabar of months, and partly from documents [1]: the latter offer 13 names of which Hrozný tries to explain away the last by identifying it with another. The names in the two sources sometimes vary considerably, but are chiefly of Babylonian origin. Several, according to Hrozný's interpretations, refer to the seasons: *še-ir(-i)-eburi,* (month of the) prospering of the harvest; *tam-ti-ru-um,* month of rain; *tar-bi-tum* (month of the) growth (of plants). *Pi-te-bâbi* means 'opening of the gate', and probably refers to a religious ceremony.

The ancient Assyrian list of months is partly preserved in the syllabar of months, and also occurs in the inscriptions of the early Assyrian kings and in the so-called Cappadocian tablets, which come from an Assyrian colony of the third millenium at Kara Eyjuk in Asia Minor. We find: — 2, perhaps month of the moon-god; 3, *ku-zal-li,* shepherd's month; 4, *al-la-na-a-ti,* also shepherd's month; 6, *ša sa-ra-te,* perhaps the name of some employment; 12, *qar-ra-a-tu,* name of an occupation (?). The other names are missing or are uncertain. In regard to the interpretation of the names from occupations a certain caution should be exercised, since in accordance with all the examples hitherto given a name like 'shepherd's month' ought to refer not to the occupation as such but to the pasture season. All other explanations are quite problematical.

In the above I have only been able to reproduce the material collected by Assyriologists and the explanations given by them: but from this it clearly appears that the development

[1] **Hrozný, pp. 85 ff.**

of the series of months has proceeded in the same fashion here as elsewhere. At the beginning we find an indefinite number of names of months borrowed principally from natural phenomena. Among these a selection takes place, the result of which, however, is different in each city. At first it seems as though series of 13 months arose. But these series, as the examples from Lagash shew, were not fixed throughout. New names penetrate into them, even the position of the month can be altered. Finally the series becomes quite fixed, and with this seems to be connected the falling away of the thirteenth month: in the series of months now fixed at twelve the leapmonth becomes a doubling of the preceding month. While this development continues, the calendar takes on more and more an ecclesiastical stamp, since months named from festivals are constantly ousting those named from natural phenomena, and finally attain to almost exclusive predominance. This is easily to be understood in the case of ancient Sumer, since not only were the priests alone — here as elsewhere — in possession of the art of writing and the other higher branches of knowledge of the people, but the temples also had the largest landed property, with an extensive administration. Occupations and religious ceremonies, festival seasons and time-reckoning for practical purposes were more closely connected at that time than at any other. The Semitic calendars all present the same characteristics as the ancient Sumerian, a resemblance which is only slightly disguised by the fact that the signs of the now fixed Sumerian series of months are used as ideograms of the months. Everyone read the ideograms in accordance with his custom, so that a variety in the names of months still existed, as the phonetic writings testify. But the fixed writing naturally contributed to bring about fixed readings, i. e. a fixed series of months.

2. THE ISRAELITES.

The Israelites, like all Semitic races, reckoned in lunar months. I need not discuss the views which ascribe to them a solar year, or would make the old Canaanitish months divi-

sions of the solar year. From early times the day of the new moon was celebrated with general festivities and rest from labour, and the old feasts of the agricultural year seem to have been postponed till the time of full moon. Like the Homeric Greeks, the Jews at their immigration had no names of months. Hence they took over the old Canaanitish names. The latter appear in the oldest portions of the law, in the regulations for the feast of the Passover, which is to be celebrated in *chodesh ha-abib,* the month of ears of corn, and in the history of the building of Solomon's temple [1], where three others — *chodesh* or *yerash ziv, yerash bul, yerash ha-etanim* — are mentioned and compared with the numerical months by which their position is fixed. Of these *y. bul* and *y. etanim* recur among the eleven Phoenician names of months known from inscriptions. The above-mentioned series of months, which we possess only in fragments, was therefore at least in part identical with the Phoenician: hence the term 'old Canaanitish' is justified. The explanations are also clear, having regard to the position of the months in the year. *Chodesh ha-abib,* corresponding to the first month, about April, is the month of the ripening ears. *Yerash ziv,* the second, about May, the month of brightness (though certainly the etymology is not certain), is referred to the splendour of the blossoming season, though this falls earlier. But in May the dry season begins, and so one would think rather of the splendour of the sun. *Yerash ha-etanim,* corresponding to the seventh, about September, means month of the flowing, i. e. of the perennial streams, which now at the end of the dry season are the only ones that have water. *Yerash bul,* the eighth, cannot be referred to the gathering of the fruit *(bul),* which has already taken place, but probably means the rainy month, since the autumn rains now begin [2]. The descriptions are therefore of the kind already sufficiently familiar.

But in the writings of the Old Testament the numbering of the months, beginning at the Feast of the Passover, is the common method of description, which is only replaced by the

[1] 1 Kings, Chap. VI and VIII. [2] Dillman, p. 926, König, p. 612 ff., and elsewhere.

Babylonian names of months after the Captivity. It seems to be fairly generally recognised that the numbering is later, and according to what has already been shewn about the numbering of months [1] this is always a phenomenon of an advanced stage of civilisation. The inclination of the people towards concrete descriptions of months must also have prepared the way for the introduction of the Babylonian names. As to the date of the introduction of the numbered months there is considerable difference of opinion: at the time of Solomon [2], about 600 B. C. [3], first demonstrable among the writers of the Captivity [4]. For our purpose the chief point to note is that the numbering is more recent than the naming of the months. This question is again connected with that of the beginning of the year, which will be dealt with below. For if the series of numbered months begins in spring, yet there are also indications of an earlier beginning in autumn [5].

New evidence both for the beginning of the year in autumn and for the months is found in an inscriptional calendar from Gezer, dating from about the year 600 [6]. It runs: — Two months: bringing in of fruits; two months: sowing; two months: late sowing; one month: pulling up of flax; one month: barley harvest; one month: harvest of all other kinds of corn; two months: vintage; one month: fruit-gathering. This agrees with the course of the agricultural occupations, reckoning from about September, — the bringing in of fruit is not the harvest but the carrying home of the harvest from the fields — but is naturally systematised so as to cover the months. Whoever drew up this list knew neither fixed names nor a fixed enumeration of the months: the question can only be whether this state of affairs must have been general at the date 600 B. C. The purpose of the list does not seem to me to have been clearly recognised. It is obvious that such a list must have been drawn up for practical ends. It helps to regulate the calendar. From the agricultural work just engaged in the present month is recognised: and then, with the aid of this calendar, it becomes possible to calculate how many months will elapse be-

[1] Above, p. 204. [2] Schiaparelli, *A. Test*, p.139. [3] König, p. 636. [4] Wellhausen, *Proleg.*, p. 110. [5] See below, pp. 272 ff. [6] Finally discussed by Marti.

fore some other occupations begin. If this calendar came into general use, names of months of the usual type would arise from it.

It has been remarked above that the Israelites at their immigration into Canaan had no names of months. Of course, like all other primitive peoples, they occasionally reckoned a few months up to or after this or that event, e. g. pregnancy. This counting was a shifting one, i. e. it had no reference to the solar year. That the practice of counting the months was known is proved by the common word for month, *chodesh,* literally 'newness', 'new moon', from *chadash,* 'new'. The word for moon is *yareach.* Among the Phoenicians *chodesh* means only 'new moon': 'month' is *yerach.* In the Old Testament this latter word also occurs several times: in the account of the building of Solomon's temple [1] (in three cases characteristically combined with the old Canaanitish names), in Exodus [2], in Deuteronomy and II Kings (in the expression *yerach yamim* [3]), and lastly, poetically, in Moses' departing blessing [4] and a few times in Job and Zechariah.

When it is remembered that the months are counted not only continuously but also by the appearance of each new moon [5], it becomes clear how the word *chodesh* has come to mean 'month', and this is also a sure evidence for the practice of counting the months, though not from a definite point of departure. The latter process, i. e. the numbering of the months, is much later. The earlier books of the Old Testament provide interesting material for the significance of the word [6]. *Chodesh* means 'new moon', 'feast of the new moon' in the old narrative of Jonathan and David [7]; in the combination 'new moons and sabbaths' [8]; and in the regulations of the Priestly Code about the burnt offering

[1] I Kings VI, vv. 1, 37, and 38; VIII, 2. [2] Exod. II, 2, Moses' mother hid him three months'. [3] i. e. 'month of the days', Deut. XXI, 13, II Kings XV, 13. [4] Deut. XXXIII, 14. [5] Above, p. 151. [6] I have examined the passages by the aid of Mandelkern's Concordance and the analysis of sources in Kautzch's translation of the Bible: for the numbered months cp. also Wellhausen, *Proleg.,* p. 110. [7] I Sam. XX. [8] First in the somewhat later narrative of Elisha, II Kings IV, 23; then in Amos VIII, 5; Isaiah I, 13; XLVII, 13; LXVI, 23, etc.

of the new moon [1]. From the new moon the days of the month can be counted, and this is done in one case [2]. The number of months is determined by counting the new moons: thus certain passages can be understood (though not necessarily so), e. g. in the Yahwist, Gen. XXXVIII, 24, "it came to pass about three new moons (months) after", and in Amos IV, 7, "when there were yet three new moons (months) to the harvest". Here 'new moon' and 'month' are essentially identical: in this manner a change of sense has come about. Another point is whether at the time in question the word in this connexion had the sense of new moon or of month: I should be inclined to regard the latter supposition as correct. In the regulations for the Passover Feast also the sense is not to be determined definitely [3]. If prominence is given to the idea of duration of time, the sense 'month' clearly appears, e. g. in the story of Jephthah's daughter: [4] "Let me alone two months, that I may depart and go down upon the mountains, and bewail my virginity." Thus the word in earlier and later times is often used in the counting of the months [5]. The sense 'month' can be rendered clear by the addition *yamim* [6], which is an older idiom, for neither with *chodesh* nor with *shana*, 'year', is *yamim* originally an empty addition. *Shana* perhaps means 'change', 'recurrence', i. e. of the seasons. If the word is used in a calendarial sense, *yamim* is a practical explanation. The result is that *chodesh* stands for 'month', even where the idea of the new moon is completely excluded, e. g., with numbers of days added, as early as in the Yahwistic part of the old History of the Kings, II Sam. XXIV,8, 'nine months and twenty days', or in the history of Solomon, 1 Kings V, 14: "And he sent them to Lebanon, ten thousand a month by

[1] Num. XXIX, 6; XXVIII, 11, 14. [2] I Sam. XX, 28, 'the morrow after the new moon'. [3] First the Yahwist, Ex. XXXIV, 18, and his reviser, XIII, 4 ff; XXIII, 15; XXXIV, 18; further the Deuteronomist, XVI, 1, and in Ex. XII, 2. [4] Judges XI, 37 ff. [5] One month: Lev. XXVII, 6; Num. III, (often); IX, 22; XVIII, 16; XXVI, 62; I Kings IV, 7, 27; V, 14 (in the history of Solomon); several months: I Sam. XXVII, 7 (the old History of the Kings); II Sam. II, 11; V, 5; VI, 11; XXIV, 8, 13; I Kings XI, 16; II Kings XV, 8; Deut. XXIII, 31; XXIV, 8. [6] The Elohist, Gen. XXIX, 14; the Yahwist, Num. XI, 20; Jud. XIX, 2; XX, 47.

courses: a month they were in Lebanon, and two months at home". The older senses belong in general to the older writings; it is however to be presumed that before the beginning of the literary period the change of sense had already advanced rather far.

In by far the greatest number of cases *chodesh* stands in combination with an ordinal numeral, not in Deuteronomy, but in Jeremiah and the writers of the Exile, in the last Reviser of the Pentateuch, in the Priestly Code. Hence it follows that these numbered months are a late innovation, and they will be spoken of again in connexion with the matter of the beginning of the year [1].

3. THE PRE-MOHAMMEDAN ARABIANS.

The series of months now used by the Arabs is the ancient Meccan series, which, on account of the importance of Mecca as a centre of trade, had acquired a more than local extension and was adopted by Islam. Besides this series others are handed down, partly by Arabian writers, and partly in the Sabean inscriptions: the latter I pass over, since there is no translation of them, so that they are of no use for my purpose [2]. The Meccan series is: — 1, *safar I,* now called *muharram,* 'the holy', a re-naming which, according to an Arabic author, Buchari, first took place under Islam; 2, *safar II;* 3, *rabi I;* 4, *rabi II;* 5, *jumada I;* 6, *jumada II;* 7, *rajab;* 8, *sha'ban;* 9, *ramadan;* 10, *shawwal;* 11, *dhu-l-qa'da;* 12, *dhu-l-hijja.* These names, in so far as they are explainable, refer to seasons and festivals. This is best seen from the three pairs of months which form the first half-year. I quote Wellhausen: [3] — "For the season Çafar the Lisan 6, 134 gives abundant examples; it gives a name to plants which grow at that time, animals which are born then, and rains which fall in it. It falls in the autumn. Gumâda often occurs in the old poetry and always refers to the worst winter-cold, the dear time in which the poor must be fed by the rich. Espe-

[1] See below, pp. 272 ff. [2] Enumerated by Ginzel, I, 240; cp. Wellhausen, *Reste,* p. 94, note 1. [3] Wellhausen, *Reste,* pp. 96 (with note 1), 97.

cially favoured is the description of the evil night in Gumâda, when the dogs do not bark, the snakes, which are otherwise out at night-time, remain in their holes, and the traveller eagerly looks out for a friendly fire. The Rabi' falls, according to the calendar, between Çafar and Gumâda, and therefore in late autumn. But commonly the Rabi' is the season when, after the autumn and winter rains, the steppe becomes green and the tribes disperse to the pastures, where the camels bring forth their young and the rich milking-season approaches..... The camels are pregnant 'in the tenth month', and bring forth their young in February." This statement is supported by the etymology. *Safar* comes from a root with the meaning 'to be empty'. Since two months appear between *safar* and the cold season, the two months of *safar* include the end of the dry and the beginning of the rainy season, before a more abundant vegetation has sprung up, and are therefore the worst period of lack of food. The root from which *jumada* comes has the sense 'to grow stiff', which suits the time of the sharp cold. *Rabi* as a season has a double sense, it is partly used to describe a period in autumn which is often identified with *charif,* the date-harvest, and partly to describe the pasture-season in spring. The explanation of this fact is doubtless that the word refers to the sprouting vegetation, the pasture-season, partly, indeed, to the vegetation which appears simultaneously with the autumn rains, but partly to the richer pasture which springs up with the increasing heat after the winter rains. Out of these three seasons, according to a familiar precedent, six months are made. They do not exactly cover the winter half of the year, but fall somewhat earlier, since the last month, *jumada II,* belongs to the cold period. As for the other months, the sense of *ramadan,* 'the hot', is certain, and it alludes to the warm season, in fact to its beginning, since *ramadan* is the third month after *jumada II.* The attempted explanations of *sha'ban* and *shawwal* are all very uncertain. The other three names refer to festivals. In *rajab* a festival was celebrated in all holy places, in which sacrifices of camels and sheep were offered up. The root means 'to fear, to reverence'; the month is therefore called the 'holy',

or the 'deaf and dumb', since the noise of weapons is stilled. The names of the last two months refer to the great pilgrimage to Mecca. *Dhu-l-qa'da* is 'the month of sitting', and the explanation given for the name — that the month was so called because in it no expeditions or predatory excursions took place — is doubtless correct. It is the first month of the holy peace which prevails during the time of pilgrimage. The second month is named from the feast of pilgrims itself, *dhu-l-hijja*.

CHAPTER IX.

CALENDAR REGULATION. 1. THE INTERCALATION.

The circumstance that the lunar months are among almost all peoples named from the phases of Nature involves the necessity of an agreement between the two really incommensurable periods given by the sun and the moon. This problem is the central point of the older scientific chronology. We shall now investigate more closely how the problem has arisen, and what has been its development among the primitive peoples.

Where there is only a series of less than twelve months, the problem of calendar regulation does not exist. The series is begun on the appearance of the signs from which the first month is named, and is continued from that point until the end. The vacant period serves, unconsciously of course, to bring lunar reckoning and solar year into agreement. Nevertheless the months can be fixed in a more accurate fashion. The Eskimos of Greenland, for instance, mark the winter solstice by the position of the sun, and then begin to count the moons, and continue doing so until the moon can no longer be observed in the bright summer nights [1]. The Lower Thompson Indians in British Columbia counted up to ten or sometimes eleven months, the remainder of the year being called the autumn or late fall. This indefinite period of unnamed months enabled them to bring the lunar and solar year into harmony. Also the Shuswap and the Lillooet in the same country counted eleven months and then the 'fall-time', which was the balance of the year [2].

Among most peoples, however, a series of months cover-

[1] Cranz, I, 293, Dalsager, p. 54; cp. Holm, *10*, p. 141, and *39*, p. 105, respectively. [2] Above, pp. 185 f.

ing the whole year has arisen, and this series has more often 13 than 12 months. Here the difficulties first begin. If a new moon falls on a certain day of the solar year, in the following year a new moon will occur about 11 days before or 19 days after this day, and in the year after that about 21 days before or 9 days after it. Since the natural phases are bound up with the solar year, they get out of place in relation to the moon. The situation is still further complicated by the fact that the phases of Nature, and with them the occupations, vary somewhat according to the peculiarities of the climate in different years. Hence doubt arises, and the accustomed order of succession of the months is broken. And this is not a mere theoretical piece of reasoning: primitive peoples are not seldom in perplexity as to which month they are to count. Of the Dakota it is said that they often have heated debates as to which moon it is. The raccoons do not come out of their winter holes at the same time every winter, the conditions which cause inflammation of the eyes do not appear at the same time every spring, the geese lay their eggs at a slightly different period according to the character of the year. Twelve moons do not bring them back to the same point in the season as that from which their reckoning began; and therefore towards the end of the winter there is dispute among the Dakota as to the correct current date [1]. If the people has a thirteenth month, the matter is no better. Of the Pawnee, who had an intercalary month, it is stated that they sometimes became inextricably involved in reckoning, and were obliged to have recourse to objects about them to rectify their computations. Councils have been known to be disturbed, or even broken up, in consequence of irreconcilable differences of opinion as to the correctness of their calculation [2]. The same is reported of the Caffres. Their months are named e. g. from the first cry of the cuckoo, the flowering of the erythusia, the dust in the dry season, midwinter, and since all these phenomena may appear at somewhat different dates, even the Caffre astrologers do not know what moon they are really in. The first appearance of the Pleiades just before sunrise always rectifies

[1] Mallery, *4*, p. 99; cp. Riggs, *Grammar*, p. 165. [2] Dunbar, p. 1.

the confusion [1]. Even peoples who have a developed, astronomically regulated, lunisolar calendar sometimes have recourse to the natural phases in order to rectify it. In Bali not only were the stars observed but also the flowering of certain plants, or even the date when the white ants got their wings, in order to rectify the lunar calendar [2]. The months of the Bataks of Sumatra are regulated by the constellation Scorpio [3]: the magicians, who control the calendar, are not certain as to the position of the months, but look for general points of reference in the phenomena of Nature. Thus, for instance, the dates of certain migratory birds are known: they come in the fourth and go in the first month. In the third month a black flying-ant is accustomed to appear in great numbers. The presence of the bird of prey *lali piuan* makes known the sixth and seventh months. The bird *sosoit* sings in the eleventh month, and the turtle-dove is silent in the eighth. The west monsoon proclaims the third, storms are very frequent in the eleventh and twelfth [4].

Many peoples slip over the difficulties, they do not properly know of how many moons the year consists: such peoples are the Dyaks [5], the Warumbi of Central Africa [6], the Ibo-speaking peoples [7], the Algonquin [8]. But if a definite series of months is established, without a vacant interval such as occurs in the case of some peoples, the number of months naturally becomes 12 or 13. Even in this case the people sometimes let matters go as they will, as is reported of the Yukaghir. The people having been christianised, says our authority, it is now difficult to say whether the ancient Yukaghir made some adjustment by adding a month to accomodate their lunar year to the solar one. It seems to me, from the answers which I received from the Yukaghir to my inquiries, that this point did not interest them. Generally a month is the time from one new moon to another, but it did not matter to them whether twelve such months made up a full cycle of the year or not.

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[1] Macdonald, p. 291. [2] Friederich, p. 88. [3] Below, p. 250. [4] Winkler, p. 439. [5] Nieuwenhuis, I, 317. [6] Maes, p. 627. [7] Thomas, *Ibo*, I, 127. [8] Beverley, p. 181.

When it was necessary they simply ignored some of the names of months, being far ahead [1]. The Koryak have twelve lunar months, and the first one begins at the time of the winter solstice and corresponds to our December. Yet they are very little troubled by the fact that in the interval between two winter solstices an extra new moon may occur [2]. The very perplexity described above implies a great advance, viz. the recognition of the difficulties, which is the first stage towards mastering them.

Therefore every now and again some month must be left out or a month added. This necessity, at first not recognised, or not clearly so, is the chief cause of the above-mentioned disagreement in the reckoning of the months [3]. For when the counting is performed in accordance with the series only, it soon happens (apart from the climatic variations of the years already mentioned) that the months deviate from the natural phases from which they are named. The arguments in the dispute as to which month it really is are based on the condition of the phases of nature: the result is a correction of the counting, i. e. the months are pushed forwards or backwards according to circumstances, i. e. the month which should have followed is left out, or a month is added to the series. Thus an intercalation comes about without it being suspected what is really done. In general the whole process is not even so conscious as the desire for theoretical exactness has led me to represent in using the example of the Dakota. The series and the number of months were from the beginning unstable, and the natural conditions have brought it about that this characteristic has been preserved in at least one particular, viz. that in certain cases a month could be passed over. Let us, for the sake of clearness, take a fictitious example from Swedish conditions. As a rule the rye-harvest falls at the beginning of August, the oat-harvest at the end of August and beginning of September, the potato-harvest at the end of September. These occupations might very well be distributed among three months named after them. But a year would sometimes come in which the oat-harvest took place about at the

[1] Jochelson, *Yukaghir*, p. 42. [2] Jochelson, *Koryak*, p. 428. [3] Above, p. 241.

interval between two moons, the rye-harvest at the beginning of the first moon, and the potato-harvest at the end of the second moon. There would therefore be no place for a month of the oat-harvest, it must simply be omitted. That this is the case among the primitive peoples is proved by the fact that many, in fact most, of them have a series of thirteen months of which one must according to circumstances be passed over in certain years.

Experience teaches the peoples who have only a twelve-month series that this is not sufficient: so we are told of the Mandan and Minnetaree that they have generally recognised that the year has more than twelve months [1]. When the intercalary month, as among certain Indians, is named 'the lost month' [2], this points to the fact that it is an addition to a twelve-month series, just as in Babylonia, where the same method of expression recurs [3]. The Masai have twelve months [4]. The great rains cease with *loo-'n-gokwa,* which is named from the evening setting of the Pleiades. Should the rains still continue at the beginning of the following month, the Masai say: — "We have forgotten, this is *loo-'n-gokwa.*" Should the hot season not be over at the beginning of the month following *ol-oiborare,* they say: — "We have forgotten, this is *ol-oiborare*" [5]. It is clear that if through the dead reckoning the months are advanced in relation to the seasons, one month will be repeated, i. e. intercalated. The preceding month is forgotten.

Thus the necessity for modifying the series of months is felt, and in response to this an empirical intercalation arises. When this intercalation is left to itself, conflicting opinions, as we have already seen, arise as to it. An end is made to these disputes and order is established when the decision is placed in the hands of definite persons. This was done among the Jews, the regulation of whose calendar affords a particularly plain example of this empirical intercalation, which, out of religious conservatism, they kept until well into the post-Christian

[1] Matthews, p. 4. [2] Carver, p. 175. [3] Below, p. 262. [4] Above, pp. 201 f. Hollis, p. 334.

period, in fact until the necessities of the Dispersion compelled, from the second century, a mitigation of the original rules, and finally at an uncertain period, perhaps not until medieval times, led to a calculated regulation. According to the Talmud the appearance of the crescent of the new moon was determined by deposition before a court of justice of three members. After that the beginning of the month was signalised in the country in earlier times by fires, later by couriers. A suitable intercalation was absolutely necessary for the celebration of the feasts, since at the Feast of the Passover on the 14th of Nisan the first-fruits of the corn were offered, and the two other great feasts were also of an agrarian character. For this purpose the court of justice visited the fields. If they saw that the crops were not yet ripe at the Passover time, and that the fruits also were not so far advanced as they were accustomed to be at this time of the year, they intercalated a month in accordance with these two signs: if only one of these signs was to be observed the decision was made to depend on other minor circumstances [1]. By way of example I give an official document of Rabbi Gamaliel II, issued to the inhabitants of Judaea, Galilaea, and the Dispersion at the date 90—110 A. D [2]. "We make known to you that the lambs are small and the young of the birds are tender and the time of the corn-harvest has not yet come, so that it seems right to me and my brothers to add to this year thirty days." The intercalary month was the last month of the year, *Adar*. On rare occasions *Nisan,* when it had begun, was altered into *Adar II.* Here the intercalation took place in the interests of the religious cult, but the cult on its side was dependent on the natural phenomena. The intercalation is of the same empirical order as that which we have met among the primitive peoples. It is only that the development of the ecclesiastical laws has led to a judicial procedure, and the task of determining the intercalation has been handed over to a committee of the Sanhedrin.

There exists a possibility of a somewhat different deve-

[1] Ginzel II, 41, 44. [2] Dalman, p. 3.

lopment among peoples who originally had less than twelve months and also counted a vacant interval: it is conceivable that the unnamed months may be named, until at last twelve months have names and the vacant interval remains only as an intercalary month. This seems to be the case among the Central Eskimos; they have a 'sunless' month, which covers the time when the sun does not appear and when there is also hardly any twilight: it is said to be of indeterminate length. After an interval of a few years this month is left out, if new moon and winter solstice coincide [1]. When the intercalary month has thus arisen, its position in the year is fixed. One other example of this method may exist. The author who gives the list of the months of the Kwakiutl of the Island of Vancouver, beginning with March, inserts between the tenth and eleventh months the winter solstice, and says that the solstice moons are called by a name which probably means 'split both ways', and adds that the readjustment is made in midwinter [2]. Unfortunately the author does not tell us how the readjustment is made, whether the winter solstice moon or some other moon is the intercalary month. If the former be the case, the explanation is given by the above.

There is rarely any rule for the position of the intercalary month. Where the sources simply enumerate a thirteen-month series, it is to be presumed that no fixed position for the intercalary month exists. But such a month can be found, since naturally a month named from a natural phase of less importance will be omitted, or an additional month inserted, at a time when there is little work going on, and when consequently little attention is paid to the time-reckoning. So it is said of the Pawnee that the intercalary month was usually put in after the summer months [3]. On the Society Islands the month corresponding to our March or our July was commonly omitted [4].

The first regulation of the calendar is therefore roughly empirical, and in fact is nothing but an occasional and arbitrary deviation, necessitated by the natural phases, from the

[1] Boas, *Eskimo*, pp. 644 ff. [2] Boas, *Kwakiutl*, pp. 412 ff. [3] Dunbar, p. 1. [4] Ellis, *Pol. Res.*[2], I, 86.

existing series of months. The natural phases, however, as we saw in chapter IV, are determined in more accurate fashion by the stars, and particularly by their risings and settings. Consequently the months also can be named from stars, and a considerable number of such names of months was found in the lists of chapter VII. This phenomenon has hitherto been only briefly touched upon; for the regulation of the calendar it is of supreme importance, since the risings and settings of the stars accurately determine the date, so that the fluctuation of the natural phases is excluded. Where only one month is named after a star and determined by it, the series of months is immovably fixed.

Just as the Pleiades play the most important part in the determination of time from the phases of Nature, so it is also in the naming of the months. The Konyag have a month named from this constellation, which is followed by one named after Orion [1]. Of the Diegueño of S. California it is stated that they divided the year into six months and observed the morning rising of five chief stars. The names of months are given, but unfortunately there is no information as to the sense [2]. The Hottentots and the Herero both have a Pleiades month [3]. On the islands of the Pacific Ocean the practice is carried so far that in some cases every month is described by the rising of a constellation, as is done by the Maoris [4], or even named from stars, as among the inhabitants of Mortlock's Island [5] and, for most of the months, by tribes of the Torres Straits [6].

This, however, is an exception. Where only one month is named from the rising of a star or brought into connexion with it — in this case the stars in question are usually the Pleiades — the latter furnishes the means of correcting the reckoning of the months, and the intercalary month is consequently introduced, as need arises, before the month in question. The Pleiades month therefore of itself becomes the starting-point of the reckoning of the months, i. e. becomes the beginning of the year. Immediately after the discovery of

[1] Above, p. 184. [2] Dubois, p. 165. [3] Above, pp. 197 and 199. [4] Above, pp. 211 f. [5] Above, p. 210. [6] Above, p. 208.

America it was already reported of certain tribes on the Mexican coast that they began the year at the setting of the Pleiades and divided it into moon-months [1]. In Loango the months are counted from new moons, but Sirius, the rainy star, offers a means of correcting the reckoning sidereally. With the first new moon which sees Sirius rising in the east their new cycle of twelve months begins, and this must run as well as it can until the new year. When the cycle of months and the year do not fit, which happens about every three years, a thirteenth month must be inserted. This is the evil time, when the wandering spirits are at their worst [2]. The Caffres have twelve moon-months with the usual descriptive names: on this account uncertainty often arises as to which month it really is. The confusion is always rectified by the morning rising of the Pleiades, and the reckoning goes on smoothly for a time, until the months once more get out of place and it becomes necessary to refer again to the stars in order to correct them [3]. In Bali the Pleiades and Orion are observed for the purpose of correcting the calendar of moons by intercalation; thus the month *kartika* is doubled, or the month *asada* is prolonged until the Pleiades appear at sunset. Moreover certain natural phenomena are observed [4]. In New Zealand, where all months were described by stars, the year began with the new moon following on the rising of the winter star *puanga* (Rigel) [5]; the thirteenth month often passed unobserved [6], i. e. served as an intercalary month. Elsewhere we are told that the displacement of the moon-months in relation to the year was rectified through the observation of the rising of the Pleiades and of Orion, and that the most accurate way of calculating the beginning of the year was to observe the first new moon after the morning rising of Rigel [7]. The Papuans limit the year by the constellation of the Serpent, *manggouanija;* when it appears again in the north, it is a sign that the new year is beginning [8]. The

[1] Petrus Martyr, *De nuper sub D. Carolo repertis insulis,* Basileae, 1521; quoted by Ginzel, I,446, note 1. [2] *Loango Exp.,* III: 2, 138. [3] Macdonald, p. 291. [4] Friederich, p. 86. [5] Taylor, p. 362. [6] Thomson, I,198. [7] Treagear, p. 114. [8] De Backer, p. 407.

people of Nauru, west of the Gilbert Islands, count by moon-months. The time that elapses until the Great Bear returns to the same spot is reckoned as a year [1]. The last two reports are so condensed that it is impossible to see whether the stars serve for the rectifying of the calendar of moons found among these peoples, or only for the fixing of the beginning of the year, which, as will be shewn below, may be independent of the reckoning of months.

About the regulation of the Hawaiian calendar the authorities are not unanimous. Dibble says (p. 108) that the month *welehu* completed the year, and the new year began with the following month, *makalii*. The year varied between 12 and 13 months. Each month had 30 days; however he adds that in practice the number of days varied between 30 and 29. This is the phenomenon familiar in other places, e. g. in Greece, among the Bataks, etc., in which a round number of 30 days is given to the moon-month, the real length of this being a little more than 29 $^1/_2$ days. Fornander (I, 119 ff.) states that this variation, though not common, did occur, but asserts that the year of 360 days was rectified by the intercalation of 5 days at the end of the month *welehu:* these were *tabu* days, dedicated to the festival of the god Lono. Similarly an old woman of Maui stated that eight months had 30 days and four 31, and that these additional days were called *na mahoe,* 'the twins' [2]. This statement cannot be correct, since the month was strictly lunar and must have been wholly disarranged by these intercalary days, as is pointed out by the historian of the Sandwich Islands, W. D. Alexander [3]. This writer also remarks that it is a well-established fact that the ancient Hawaiians intercalated a month about every third year, but that the rule governing the intercalation is unknown. Certainly there was no such rule, but the intercalation was empirically treated, and regulated by the appearance of the Pleiades. Such contradictory statements as the above are due to the influence of the European calendar, owing to which the native calendar has early fallen into disuse. Fornander has probably mistaken a feast for intercalary days.

[1] Brandeis, p. 78. [2] Malo, p. 59. [3] Quoted by Malo, p. 59, note 7.

The treatment of the calendar among the Bataks of Sumatra is of great interest. The calendar indeed originates in India: the days of the months shew the familiar names of planets in corrupted Sanskrit forms, four times repeated and distinguished by various additions. Only the 28th and 29th or the 29th and 30th days, as the case may be, have names of another kind, so as to equalise the number of the days of the moon-month. The week is therefore not shifting but is immovably fitted into the month. The months are regulated by Scorpio, the largest star of which is Antares. The year begins with the new moon at the morning setting of Orion and the contemporary morning rising of Scorpio in May. The full moon fourteen days later then stands in the constellation Scorpio. In the first half of the year the full moon goes farther from Scorpio every month, and in the second half gets nearer and nearer to it. In the Batak calendar, which has 12, sometimes 13, $\times$ 30 squares, the sign of Scorpio is registered at the proper day, and the month is decided by it. As a means of control the soothsayer uses a buffalo rib with 12×30 holes (four times repeated), and every day he draws a string through one hole in order to keep account of the days. It is clear that the calendar can give no certain help in the establishing of the month, and that the means of control must be directly misleading, since the moon-months vary between 29 and 30 days. For this reason the soothsayer is often uncertain in his reckoning of the months, and refers to the natural phases in order to correct it [1]. Hence in his selection of days he looks not only to the current month, but also to the preceding. Our authority says that the surplus month is no intercalary month in the European sense, although it is likely that to it originally fell the task of equalising the lunar and the solar years. This is indeed the only correct explanation. When, presumably in the twelfth month, a following month is involved in the decision, the thirteenth is also included so that an intercalation takes place. If the thirteenth month is not available, the first is taken, we are told. But an intercalation is necessary all the same: the observation of the natural phases and of the morn-

[1] Above, p. 242.

ing rising of Orion serves for the correction. And this can happen just because the people are uncertain in the reckoning, and act according to circumstances. The Batak calendar is a product of decay, and is used exclusively for divination, not as a genuine calendar [1]; but it is of great interest to observe how the soothsayers, since they do not possess the knowledge necessary for a proper management of the calendar, fall back upon primitive methods. It is significant that the indispensable thirteenth month has often been lost: the people do not even understand the difference between the months and the year, and yet they cannot avoid the necessity of the intercalation.

There are two historically important cases of this empirically regulated intercalation of months, which must be dealt with in detail, since they are much debated. The dispute has arisen from a failure to recognise the empirical intercalation and its workings. The one case is that of the old Arabian calendar before Mohammed, the other that of the Babylonian calendar.

The old Arabian names of months depend in great measure, as has been shewn already [2], upon the seasons. Originally therefore the months must have been connected with the solar year, and must have been approximately fixed in their position by the sufficiently familiar empirical method. The same thing is shewn by the naming of the last months from the pilgrimage to Mecca. In pre-Mohammedan times the pilgrimages were at the same time business journeys; trade and cult were, as so often, united, and commercial intercourse was first made really possible when by religious sanction a time of peace was established during which journeys to and fro could be taken in safety. The first month of the peace of God is *dhu-l-qa'da;* and *dhu-l-hijja* is the month of the gathering in Mecca: the following month, *safar I,* was also included in the time of peace, and was therefore called *muharram.* During all three months there were fairs: in the neighbourhood of Mecca there was a whole succession of them, following upon each other in *dhu-l-qa'da* and *dhu-l-hijja;* in *safar* there was a corn-market in Yemen [3]. The gay life of the great fair of Mecca is described

[1] Winkler, pp. 436 ff. [2] Above, pp. 237 ff. [3] Wellhausen, *Reste,* pp. 88, 99.

in detail in old Arabic sources; it seems to have drawn the people almost more than the religious ceremonies, and first gave Mecca its real importance. An annual fair is however dependent upon the seasons, both on account of the journeys and for the products bought and sold. Sprenger has already remarked that the winter months are quite unsuitable for merchants' journeys to Syria, and that in the late summer it was not to be expected that corn which had been cut at the beginning of March should be taken in to the markets[1]. Because of the markets that were held in them, the months must also have had a fixed position in the solar year. This importance of Mecca explains why the Meccan months became so widespread. The two names *dhu-l-qa'da* and *dhu-l-hijja* are formed with *dhu,* differently from the others, and were coined at Mecca. This leads to the conclusion that these names were innovations occasioned by the business intercourse of that city.

For the purpose of determining the time of the peace of God and of the gathering in Mecca unity must prevail as to the position of the months, and for this the above-mentioned occasional correction of the position is quite inadequate. Mohammed prescribed the strictly lunar year: by this means the time of every month was definitely fixed, but in about 33 years the months would pass through the circle of a whole solar year. The question is whether before Mohammed an ordered intercalation, which he abolished, or the lunar year existed. For although it lies in the nature of things that the market should originally be connected with a definite time of the year, it cannot of course be denied that later, when the fairs had already attained this predominating position, the date could be fixed by reference to the purely lunar year. It is certain that in the years just before the prescription of the lunar year by Mohammed the months were inverted in relation to the year, so that the spring months fell in autumn and the autumn months came in the spring[2].

The passage in the Koran 9, 36 ff. is often adduced as evidence that Mohammed abolished the intercalation: — "Truly the number of the months with God is twelve months in the

[1] Sprenger, p. 144. [2] Wellhausen, *Reste,* p. 96; *Vakidi,* pp. 17 ff.

book of God, on the day when He created the heavens and the earth. Of these four (i. e. *rajab*, *dhu-l-qa'da*, *dhu-l-ḥijja*, *muharram*) are holy. This is the right religion. Be not unjust therein towards yourselves, but fight against the heathen without distinction, since they make no distinction in fighting against you, and know that God is on the side of the faithful. The *nasî* is in truth an addition to unbelief (or, in unbelief), in which the unbelievers go astray. They allow it one year, and one year they explain it as unlawful, in order to equalise (bring into agreement) the number of that (i. e. the months) which God has commanded to keep holy. But they declare lawful what God has forbidden." It is claimed that the emphasis laid upon the fact that there are twelve months is directed against the intercalation, but this is no proof. The sense depends entirely upon what is implied by *nasî*. Etymologically the word is derived from *nasaa,* 'to push aside, away'.

On this point there has been from the earliest days of Arabic literature a dispute which has been still further complicated by modern hypotheses [1]. According to one view *nasî* is the intercalation of a month, which served to bring the months into agreement with the solar year [2]. Some authors have even attempted to establish an intercalary cycle, and it has been asserted that the intercalation was borrowed from the Jews. This opinion may be left out of account, since the cycles differ among themselves and are therefore invented, while the intercalation was governed by a hereditary *nasî*-controller from the tribe of Kinâna, who was called the *qalammas,* i. e. 'Sea of Wisdom'. If the intercalation is controlled by a central authority, as e. g. in Babylonia, an intercalary cycle is unnecessary: the central authority supplies its place.

[1] I cannot go further into this, but refer to Ginzel, I, 243 ff., though he has far from exhausted the subject. Wellhausen's treatment (l. c.) is suggestive but too dogmatic, and he leaves the *nasî* out of account. More recently Moberg has examined in detail the Arabian traditions: for particulars of his researches I refer to his paper, *Den muhammedanska traditionen i fråga om an-nasî,* St. Tegn., pp. 465 ff. His conclusion is that originally *nasî* was partly the term for the insertion of the intercalary month, and also probably the name of the intercalary month itself. [2] For quotations see Sprenger, pp. 145 ff., also Albiruni, in Ginzel I, 245.

According to the other view the *nasî* consists in the transferring of the holy character of one month to another, e. g. the declaring of *muharram* as free and the pronouncing of *safar* as holy instead of it. This view is based on the supposition that the Arabs found a time of peace lasting for three successive months burdensome, and in order to be able to make predatory excursions in a holy month, and yet keep the number of holy months unchanged, they made another month holy instead. The treatment e. g. of the *karneios* by the Argives and of the *daisios* by Alexander the Great [1] was very similar. Therefore, it is maintained, before Mohammed the year was a purely lunar one, and Mohammed only forbade the disarrangement of the holy period. These authorities also ascribe the right of changing the holy month to the *qalammas,* who at the end of the feast of pilgrims in *dhu-l-hijja* rose and in an address to the assembly arranged the re-distribution. A third view, according to which the feast of pilgrims was held eleven days later every year, until after a cycle of 33 years it came back again to the same month, is certainly incorrect, since the feast was connected with the phases of the moon. The theory is extracted from the comparison between the lunar and the solar years [2].

Several sources give the words in which the *qalammas* made known the re-distribution: they are affected by later views but must contain a kernel of truth, since they shew difficulties which are not even noticed by the authorities. According to Kalby the expression runs simply: — "The *safar* of this year is declared holy", or "free"; according to Ibn Ishaq: — "O God, I declare one of the two months called *safar,* namely the first, to be free, and I postpone the other till next year." What is meant by postponing *safar II* until the next year is unexplained and unexplainable. Since the year begins with *safar I,* and the proclamation takes place in *dhu-l-hijja, safar II* already belongs to the next year. *Safar*

[1] See my *Entstehung etc.,* p. 47. [2] Sprenger's hypothesis that the pre-Mohammedan Arabians had the lunar year but that the feast of pilgrims was held before the full moon preceding the spring equinox is also false: for the names of months shew that the feast was connected with a definite month.

II is in itself not holy, so that here there can be no question of a changing of the holy character of the month. But if by the expression *safar safar I* is understood, matters become clear. *Safar I* is doubled: *I a* is an intercalary month, and therefore not holy, and belongs as a thirteenth month to the current year; *I b* begins the new year and is holy. "I remove *safar* (viz. *I b*) to next year" is an incorrect but intelligible way of saying that the new year begins with this month. In the *Qâmûs* the expressions runs: — "O God, I am authorised to move the months or to leave them in their places and confirm them, and none can blame me or put me to my defence. O God, I declare the first *safar* to be free, and the second holy. The same do I determine in respect of the two *rajab,* namely *rajab* and *sha'ban.*" The first sentence, if authentic, doubtless refers to an intercalation, since the words are 'move the months', and not 'the holy character of the months'; but we can hardly insist so far upon the expression. The last sentence is more conclusive. It shews, namely, that not only was *safar I* shifted to *safar II,* but at the same time *rajab* was moved to *sha'ban.* This is a system, not an incidental expedient to render possible a military expedition in a holy month. Later authorities add that the holy character of *safar* was moved to *rabi I,* and that the process went on from month to month until every month in the year had at one time or another been declared holy. How this is to be understood is shewn by the oldest report which has been handed down to us. It comes from Modjahid, who was born in the year 21 of the Hegira. "The heathen were accustomed in every month of the lunar year to go on pilgrimages for only two years." It must be realised that in the course of a cycle of 33 years a month of the lunar year will coincide two to three times, according to the series, with one and the same month of the lunisolar year, and that the months of the Mohammedan lunar year and of the old Arabian lunisolar year, which must once have existed, have the same names. Modjahid's statement can only be understood thus: that the heathen pilgrimage was re-arranged every third year in relation to the Mohammedan lunar months. — two years is a rough approxi-

mation for 'sometimes two, sometimes three years' — because it was to be kept in place in regard to the solar year. But the pilgrimage took place in a definite month, and therefore the months also belonged to a lunisolar year. If the months of the lunisolar year are compared with those of the lunar year confusion results, since both series have the same names. Let us take, for example, a sentence of the distinguished chronologist Albiruni, who represents the opinion that *nasî* means the intercalation of a month: "The first intercalation applied to *muharram,* in consequence *safar* was called *muharram, rabi I* was called *safar,* and so on; and in this way all the names of all the months were changed. The second intercalation applied to *safar;* in consequence the next following month *(rabi I,* the original *rabi II)* [1] was called *safar,* and this went on till the intercalation had passed through all twelve months and returned to *muharram.*" When other writers, not so well trained in chronology, say that the hallowing of the month was transferred from *muharram* to *safar* and from *safar* to *rabi I,* this means that, according to the year, the *safar* or *rabi I* of the lunar year corresponds to the *muharram* of the lunisolar year. When in the speech of the *qalammas safar I* and *rajab* are simultaneously shifted to the month following in each case, this involves the shifting of the whole series of months. A genuine intercalation therefore takes place. The term *nasî,* 'to push aside', resembles the world-wide description of the intercalation of the month. *Safar I* is 'forgotten', but upon this it follows that not this month is

[1] I give here the English translation of Sachau, p. 73, which adds *rabi I* in brackets as an explanation. I am indebted to Prof. Moberg for the literal translation of the passage: — "The first *nasî* fell in the *muharram,* and *safar* was called by this name and *rabi I* by the name *safar,* and from this they let the months revolve in the series. The second *nasî* fell in *safar,* and the month following that *(rabi I:* Sachau) was again called *safar,* and so on, until the *nasî* had run through all twelve months and came back again to *muharram.*" As a result of the first intercalation *rabi I* became *safar,* therefore *rabi II* = *rabi I,* after the second the names are pushed another stage forwards, therefore the original *safar* = after the first intercalation *rabi I,* after the second *rabi II.* I have added a reference to the original situation.

holy, but the following one, which is now also called *safar I* but corresponds to *safar II* of the strictly lunar year. The sanctity or non-sanctity of the months was for the people the all-important point, and the *qalammas*, who was a religious authority, was obliged to refer to it. Hence he declared the month as free and the following month as holy without expressing himself, as we should have wished, in the technical terms of chronology. The people understood him: if the month after *dhu-l-hijja* was free, it followed that not this month but the next was holy, the month with which the new year began, *safar I.* The intercalation therefore involves a transference of the sanctity of the month following the feast of pilgrims to the next but one after the feast. Hence has arisen the misunderstanding that the *nasî* consisted *only* in a transference of the sanctity of the months.

The tribe of Kinana, to which the *qalammas* belonged, inhabited the district around Mecca, and the famous tribe of the Koraish, its most distinguished branch, was supreme in Mecca [1]. The calendar regulation therefore took place in the interests of Mecca and its trade, and it is quite ridiculous to say that the sanctity of a month was transferred to another merely in order to render possible a predatory excursion. Besides this would make matters no better, since all the tribes concerned would have to have peace or war in the same months. A shifting of this nature would only be really effectual if it offered a means of surprising an unsuspecting neighbour in time of peace. Probability therefore also points to the view that the *nasî* was a genuine intercalation carried out by a person appointed for the purpose, so that the dates of the markets and the pilgrimage might be fixed at the proper times of the year. For this no intercalary cycle was employed, any more than elsewhere: the empirical intercalation sufficed, and it was made known to the people at the feast of pilgrims, whence the knowledge spread all over. However the entrusting of such power over the calendar to one individual lends itself only too easily to abuses with a view to

[1] Caussin, p. 349.

ends which have nothing to do with the calendar. The stock example is afforded by the Roman pontifices at the end of the Republic. It is therefore nothing to wonder at that the calendar should have been disorganised during Mohammed's stay in Mecca. Hence also the attempts at determining the calendar from two or three certainly known dates are vain, for when a system is lacking or is broken up it is impossible to compute a calendar systematically from a couple of dates. Mohammed's action is thus to be explained: — The misuse of the intercalation had destroyed the dependence of the pilgrimage upon the time of the year: Mohammed wished to create order, and did so in radical fashion by forbidding the intercalation, the misuse of which he saw, but the usefulness of which he failed to recognise.

It has been pointed out above that the Sumerian months completely correspond in character to those of the primitive peoples [1]. The establishing of the months in their definite places followed originally from the reference to the seasons, not from the position in the series of months. The seasons on their part were, as always, brought into relation to the phases of the stars. There is indeed little information as to this point, but what little there is is sufficient to establish it. It is however much to be desired that specialists should pay more attention to the matter and if possible procure more information. The Pleiades are brought into connexion with the annual inundations, which took place about the time of the invisibility of these stars, i. e. between their evening setting and morning rising [2]. The name of the constellation Virgo means 'root of the sprouting wheat-stalk, or corn', that of the star Spica 'proclaimer of the sprouting wheat-stalk'. These names agree with the evening rising of this constellation, which at the date 2,000 B. C. took place about the 28th of February of our modern calendar, and with the morning setting, which took place some 16 days later. Circumstances exclude the ripening, which took place in the second half of April. [3] Consequently the months were also determined by

[1] Above, pp. 226 ff. [2] Kugler, *Erg.*, p. 153. [3] Kugler, I, 35 ff., II, 88 ff.

the phases of the stars: among the names of months there is one which points to this fact, 'the month in which the white star *(bar-zag)* sinks down from the culmination-point' [1]. The naming of the months from the stars has not been carried through consistently, but each month, just as e. g. among the Maoris, was fixed by one or more risings of stars. There are several lists in which now one, now two, or even three of the fixed stars are assigned to each of the twelve months [2]. In the Creation epic, Tablet V, 4 ff., we read: — "For twelve months he set down three constellations, according to the times of the year fashioned he the groups of stars." Among the Maoris all the stars suitable to the time in question are used in the fixing of the month: in Babylonia there was probably a gradual limitation to the stars of the ecliptic, i. e. the 12 signs of the zodiac, the number of which points to the fact that they owe their origin to the endeavour to fix the twelve months astronomically [3]. This is an important advance of Babylonian stellar science, that the constellations of the ecliptic should be separated from the others. Weidner, p. 21, inverts matters when he says, with reference to a list in which, instead of the fainter constellations of the zodiac, neighbouring bright stars are given (e. g. Sirius instead of Cancer): — "The system of the *paranatellonta* is also found already, i. e. the system which allows neighbouring bright stars or constellations to step in instead of less bright constellations of the zodiac. But this is no longer primitive astronomy, it marks rather, as Weissbach has already pointed out with reference to Newcomb-Engelmann, the beginnings of a scientific astronomy." On the contrary, as the examples from the primitive peoples shew, in the utilising of stars to fix a point of time or a month no notice is originally taken of the position of the star within or without the ecliptic, but the most easily recognisable stars and constellations are naturally preferred, wherever they may be situated. A list of fixed stars which determine months, including also stars situated outside the ecliptic, is primitive;

[1] Above, p. 227. [2] Kugler, I, 228 ff., *Erg.*, p. 169. [3] The connexion of the number of the 12 signs of the zodiac with the months has often been contested, but in my opinion erroneously.

it is out of the question that a constellation outside the ecliptic is referred to instead of a sign of the zodiac in the proper sense — that in which the constellations of the zodiac are to be regarded as the *prius.* After the signs of the zodiac have been fixed, so that a systematic duodecimal division of the year has been obtained, the stars situated outside the ecliptic are compared with the signs of the zodiac in order to indicate with accuracy to which month they belong, or in other words the system of the *paranatellonta* is found.

It is indispensable to enter into the all-important question of the intercalation, but here opinions are so directly opposed to one another that Weidner establishes a very accurate 38-year intercalary cycle as early as the time of the dynasty of Ur, while Kugler denies the existence of any intercalary cycle before the year 528 B. C.; Kugler again publishes a document in which an intercalary rule is recognised as dating from a time after 504 B. C. [1], while Weidner regards this as a copy of a much older original. An impartial opinion can only be arrived at by working through the material, and this is impossible for anyone who is not an Assyriologist: I am all the more compelled, therefore, to limit myself to suggestions and to the comparison with primitive conditions [2].

Where surplus months exist, there is no intercalation in the proper sense, although the same name, e. g. the 'harvest month', will recur sometimes after 12, sometimes after 13 months, since owing to the fluctuating and unstable nature of the naming of the months the latter are distributed according to circumstances [3]. This covers the difficulty. Such seems to have been the state of affairs in the pre-Sargonic period at Lagash. Certainly Kugler (II,216) has tried to demonstrate intercalary years: this is possible in the sense given above, but actually very uncertain, since the starting-points for the arrangement of the months are anything but certain [4]. Only the arising of a fixed series of months makes a genuine intercalation possible, since as a rule the general custom is to intercalate

[1] Kugler, *Erg.*, 131; cp. also Weissbach, pp. 281 ff. [2] For a general view I refer to Bezold's essay. [3] Cp. above, p. 243. [4] See Landsberger, pp. 44 ff.

a definite month (in Babylonia, at least later, there were two such months, *adarru* and *ululu).* The process is either an omission of one month in the series of thirteen, or an intercalation of one month in the series of twelve. The former appears in Lagash in the time of Sargon, the latter in the time of Dungi. We have found that the intercalation among the primitive peoples takes place as need arises. If the series of months is fixed, but the intercalation is neglected, the months must get out of place in relation to the seasons: this can be demonstrated in a couple of cases. So if the translation of the name of the fourth month in the list from Lagash is correct — *šu-kul-na,* 'sowing month' — the harvest month, *še-kin-kud,* is the twelfth, and is therefore at a distance of eight months instead of the five which the natural conditions shew [1]. Further the list at the time of Dungi shews a disarrangement of the months as compared with the Sargonic list, the tenth month having dropped out and the following months being now pushed one place forwards. This difference can be explained either by a neglect of the intercalation, or by the fluctuating nature of the nomenclature: in the latter case there is really no genuine intercalation.

At the time of Dungi and his successors we have documentary evidence for a number of years with intercalation. [2] At this date Kugler stoutly denies and Weidner supports the existence of an intercalary cycle. Weidner says: — "If we denote Dungi 39 (the 39th year of his reign) by I, the following years are proved by documents to contain intercalary months: — II, V, XI, XIV, XVI, XVIII, XX, XXIII, XXVI, XXIX, XXXII, XXXV, XXXVIII. But between Dungi 43 and 49 there is at least one more leap-year to be added, most probably Dungi 46, i. e. VIII. For the period of 38 years we should then have 14 intercalary months attested. This is therefore an intercalary system that works quite well. A 19-year intercalary cycle however it cannot be, since in that case, corresponding to the former part, the years XXI, XXIV, etc. in the latter would have to be leap-years. *We have therefore to assume a 38-year intercalary cycle, which in perfection far sur-*

[1] *Ibid.,* p. 30, note 4. [2] Kugler, II, 187 ff.; Weidner, *Memnon, 6,* 65 ff.

passes that of 19 years. It is the half of the well-known 76-year cycle of Callippus." The conclusion is unwarrantable from the premises. For the intercalation which takes place just as need arises keeps the months firmly in their place in the solar year, and attains the same result as an intercalary cycle. A period of 76 Indian years will contain just as many months as a Callippean cycle. The only conclusive factor therefore is the periodicity, and this is not proved. Through an accident of tradition the leap-years are known for a period of 38 years, and it is obvious that during these 38 years an empirical intercalation, regularly carried out, kept the lunisolar year in order. The evidence that even under the Hammurabi dynasty no intercalary cycle existed is given by Kugler [1].

But there is also direct evidence that the intercalation took place empirically, i. e. as need arose. Ungnad has shewn this from a comparison of the known leap-years. Best known of all is the letter of Hammurabi to Siniddinam: — "Since the year has a deficiency, let the previous month be entered as Elul II. And instead of bringing the taxes on the 25th Tishritu to Babylon, let them be brought to Babylon on the 25th Elul II" [2]. For the empirical correcting of the position of months the stars are used among the primitive peoples, and so also in Babylonia. A tablet in the British Museum [3] gives the following injunction: — "The constellation *dilgan* rises heliacally in the month *nisan*. As often as this constellation remains invisible, its month shall be forgotten". The same injunction is given in regard to other constellations from which months are named. The expression that the month Nisan is to be 'forgotten' reminds one of the description of the intercalary month as the 'lost' or 'forgotten' month among certain tribes of N. American Indians, and of the expression of the Masai. The forgotten month is not the intercalary month in our sense, i. e. not the second of two months that have arisen by doubling; it is the first. This month must be passed over, not counted, forgotten, its name must be transferred to the following month, so that the year may run properly. The establishing of the

[1] Kugler, II, 248 ff. [2] Kugler, II, 253, and elsewhere: the passage is often quoted. [3] Schiaparelli, *Bab.*, p. 229.

months by means of phases of the stars is so abundantly demonstrated for primitive peoples in the preceding pages that no words need be wasted in describing the method of its carrying out. It is a method that works perfectly well but is entirely empirical, and where recourse is had to this method we know that the regulation by a definite intercalary cycle does not exist. With a more extended development of the method a still better result can be obtained, and this is the direction that the Babylonians have taken. The regulation runs: — "If on the first day of the month *nisannu* the constellation of the Pleiades and the moon are together, the year shall be an ordinary one. If on the third day of the month *nisannu* the constellation of the Pleiades and the moon stand together, the year shall be a full one (i. e. a leap-year)" [1]. The meaning and effect of this rule are explained by Schiaparelli. But this too is an empirical rule, aimed at an empirical, not a cyclical, intercalation. Where an intercalary cycle exists, no such rule is needed.

Since by the letter of Hammurabi it is indisputably established that the intercalation took place not in years previously determined but at the command of the king, those who in spite of this would maintain the existence of an intercalary cycle hold to the assertion that the 27-year intercalary period was not a strictly fixed but a free cycle. In other words the intercalation rule only runs: — "Within a period of 27 years 10 intercalary months are to be inserted, but the choice of the leap-years is left open to the astronomer" [2]. But this is nothing less than an abandonment of the intercalary cycle. The purpose of such a cycle is to render it possible to compute the calendar beforehand for any number of years to come, and this purpose is frustrated by a regulation of this kind. It only says that in x years y intercalary months occur: this is not a rule for intercalation but an empirical observation, which readily results from a proper treatment of the empirical intercalation. Such observations must have been made by the Baby-

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[1] Schiaparelli, *Bab.*, p. 230. [2] Weidner, p. 73; for the 27-year period in question see below, p. 264.

lonians. In a tablet published by Kugler it is said of Saturn and of the fixed star *kak-si-di,* respectively, "..... the period of the visibility of Sirius amounts to 27 years. Turn back and consider day after day," according to Weidner, p. 73; according to Kugler I, 47 the inscription runs, "Day by day ..... shalt thou see (the same phenomena as 59, or 27, years before)." Both Kugler and Weidner find here a 27-year intercalary cycle regulated by the star; the former places it before 533 B. C., the latter at a considerably earlier period. But in accordance with what has here been said about the empirical regulation of the intercalation by phases of the stars it follows that there is no intercalation at all, but only the empirical verification of the fact that the new moon and Sirius come back after 27 years into the same mutual relationship: this will actually be the result with an accurate treatment of the intercalation based on the observation of this constellation.

Under these circumstances it would have been an easy matter to establish an intercalary cycle, but the demand for this is an affair of practical life: astronomy is concerned only with the calculation. The failure to observe this fact has led the discussion astray. The calendar is of course the most conservative of all human things; centuries after the establishment of very accurate calculations of the course of the moon and the introduction of a good intercalary cycle, the Jews adhered to the empirical observation of the new moon, and we know how difficult it is in modern times to introduce any improvement into the calendar. Because in Babylon there was a central government which could arrange the intercalation in proper fashion, the lunisolar year was kept in order, and in practical life there was no necessity to be able to calculate months and days for several years in advance. The empirical intercalation worked well, and there was no need to replace it by an intercalary cycle. The latter is indeed a simplification undertaken on practical grounds, an intercalating rule being substituted for the immediate astronomical observation: astromony is concerned only with the calculation and with the further refinement of the rule. In so far as I am able to pro-

nounce upon the material Kugler is right: no cyclically regulated intercalation existed before the Persian period; but from this it is in no way possible to arrive at any decision as to the position of the Babylonian astronomy. The regulation of the months by the phases of the stars was a suggestive problem for the astronomers, and it led to the recognition of the periodicity of the phenomena. This is the *prius,* not the desired establishment of an intercalary cycle.

A second means of fixing the months in their position in the solar year is afforded by the regulation by the solstices and equinoxes; but since, as will be shown in the following chapter, the observation of these is difficult and is seldom undertaken, a regulation of this nature is correspondingly rare. It can be demonstrated for the Eskimos [1], the Kwakiutl [2], and the Hopi, whose 13 'sun-points' doubtless correspond to the 13 months [3]. Of the Basuto it is said that an attempt is made to determine the time of sowing from the moon, but that the people commonly go wrong in their reckoning, and after much dispute are obliged to fall back upon the climatic conditions and the state of the vegetation as more certain marks for the time of sowing. Intelligent chiefs, however, rectify the calendar (i. e. the moon-months) by the summer solstice, which they call the summer house of the sun [4].

The risings and settings of the stars, as has been shewn above, are brought into relation with the seasons. There is a possibility of bringing these sidereally determined seasons into a system. Thus the year of the Luiseño Indians of S. California consists of 2×8 divisions, which are determined by the morning rising of certain stars [5]. This is however an isolated case, since the reckoning by months has penetrated almost everywhere, and both seasons and risings of stars are brought into connexion with this. The most complete example is seen in the months of the Maoris [6]. Moreover the creation of such a system was not possible among the primitive peoples, since for the purpose of determining time they were only accustomed

[1] Above, p. 183. [2] Above, p. 188. [3] Below, p. 313. [4] Casalis, quoted by Frazer, p. 117. [5] Dubois, p. 165. [6] Above, pp. 211 f.

to observe a few stars, principally the Pleiades. On the other hand the observation of the stars plays a great part in another matter not necessarily connected with the reckoning of the months, viz. the beginning of the year, and to this we shall now turn our attention.

CHAPTER X.

CALENDAR REGULATION. 2. BEGINNING OF THE YEAR.

The question of the beginning of the year presents some difficulties, since it is for the most part quite uncertain what meaning is to be attached to the phrase 'beginning of the year'. For us the new year is the great division in the calendar, and one which is emphasised by a special festival day and by various rites. This is an inheritance from ancient Rome; in particular the extremely wide-spread and popular astrology has powerfully contributed to the importance of New Year's Day [1]. In ancient Greece the New Year's Day was of no great importance: its position varied greatly in each of the small states; it was little more than the day on which the annually changing officials entered upon their terms of office. In the case of the primitive peoples the new year need not in itself be regarded as a very important division of the calendar: it has however become so among more highly developed peoples. For instance, the enumeration of the seasons or the months must begin somewhere; for this reason a beginning of the year must be supposed, but it is not therefore certain that the new year acquires any special importance. Of the inhabitants of the Torres Straits Islands Rivers says that when asked about the seasons they more than once began their list with *surlal,* and he is of the opinion that the beginning of this season is for them practically the beginning of a new year [2]. Of the Kiwai Papuans Landtman writes to me: — The year has no beginning, since there is no term to describe this, and it cannot be said that one season more than

[1] See my article *Kalendæ Januariæ,* Arch. f. Religionswiss., *19,* 1918, in particular pp. 68 ff. [2] *R. T. Str.,* p. 226.

another marks an occasion of greater importance. The people begin their list of months sometimes with *keke,* the first month of the dry season, sometimes with *karongo,* which marks the transitional period between the dry and the rainy seasons.

It will be well to begin our investigation with the natural divisions of the year. The changing seasons give several divisions one or other of which, according to preference, can be chosen as the beginning of the year. But this is not the case among the agricultural peoples. Their year falls into two parts, the period of vegetation and the time of rest intervening between the harvest and the resumption of ploughing. There are therefore two natural main divisions, the beginning of labour and the conclusion of the period of vegetation, the harvest. Both occur as the beginning of the year, the former however more rarely, as when among the Wadschagga 'the raising of the plough-stick' is also the 'opening of the year' [1]. More frequently the harvest and the great festival associated with it form the turning-point of the year. Probably however we should rather speak of an end than of a beginning of the year, as is remarked by one writer in regard to the Dyaks of south-east Borneo: — For them the rice-harvest is a principal division of the year *(njelo).* In September, at the completion of the harvest, the year is at an end. A definite beginning, a New Year's Day, is unknown among them [2]. However when the year is reckoned continuously, beginning and end practically coincide.

In the literature of comparative religion festivals of this nature are a much-discussed problem which cannot be gone into here, since it transgresses the limits of this investigation. I shall give only a few selected examples in order to make clear the relationship with the beginning of the year. Among the Carolina Indians the feast of the first-fruits or harvest was the most splendid of all: it appears to have ended the old year and begun the new. It began in August when the corn-harvest was completely over. As a preliminary all the inhabitants provided themselves with new clothes, new pots, pans, and other household utensils, and then collected all their old

[1] Above, p. 202. [2] Grabowsky, p. 102.

clothes and other worn-out things, swept and cleaned their houses, places of assemblage, and the whole town, and threw clothes and refuse, together with all the remaining supplies of food (corn etc.), on to a heap, to which they afterwards set fire. After this they took physic, and fasted for three days, and a general amnesty was proclaimed. On the fourth morning the chief priest kindled fire with pieces of wood at the public meeting-place, by which means every house in the town was then provided with fire. Then the women went to the harvest-field, fetched new corn, prepared it, and brought it with pomp to the meeting-place, where the whole populace was assembled in new clothes. Eating went on, especially among the men, and at night they danced. The festival lasted three days, and on the four following days visits were paid to neighbouring towns [1]. The New Year festival of the Konkau of California is a funeral rite which has undergone transformation. The 'Dance for the Dead' took place at the end of August; from evening until daybreak the people danced around a fire, into which food, strings of shell-money, and other small articles were thrown. Our authority does not know how the date was fixed, but the festival marked the new year, and this opportunity was taken to wipe out all old debts and settle accounts for the year that was to come [2]. Among the Amazulu the feast of the first-fruits is called the 'New Year'. Medicine staffs are everywhere set up in order to prevent 'heaven' from entering. At the end of the year new staffs are set up instead of the old ones; then the people know that the old heaven of the year has passed away with the year that is ended: the new year has its own heaven [3]. In the neighbourhood of Mombasa the new year is celebrated with fair regularity in September, after the maize-harvest; for a whole week there is dancing day and night [4]. Among the Thonga there are several feasts of the first-fruits, *luma*. When the Caffre corn, *mabele*, is ripe, the wife of the chief grinds the first grains reaped, and cooks them. The chief eats a little and offers some to the spirits of his ancestors with the words:

[1] Bartram, p. 483. [2] Powers, p. 438. [3] Callaway, pp. 406, 413. [4] Johnstone, p. 266.

"Here is the new year come", and prays for fruitfulness. At the ripening of the Caffre plum, from which a drink is extracted, some of the drink is poured out on to the graves of dead chiefs with the words: — "This is the new year. Let us not fight! Let us eat in peace!" Among the Nkuma the ceremony of the first-fruits is performed with a special kind of pumpkin, and is called 'eating the new year' [1]. On the Lower Niger, among the Owu-Waji, the year is terminated by the feast of roasted yams, which also serves as a public announcement that the labours of the field are to be resumed. Homage is paid to Ifejioku, god of the harvest, in token of gratitude for a good and fruitful year [2]. On the Society Islands a festival was celebrated with a great banquet, and this was called 'the ripening or consummation of the year' [3]. The greatest feast of the Dyaks is *dangei*, the celebration of the new rice-year after the harvest; but if the harvest fails, the festival is suspended [4]. Among the Yoruba *odun* means year, an annual festival celebrated in October and the time between two such festivals [5].

The new year is equivalent to the new harvest, the new supplies of food which through the raising of the taboo are blessed and made accessible. Where there are several fruits which ripen at different times there may be several 'new year festivals', as among the Thonga, but usually there is one principal sowing-time and consequently only one festival. A festival of this nature forms the great division of the year, and this fact is emphasised by the ceremonies which aim at clearing away everything old and beginning again. In this way the change of the year acquires great significance, but this is not universally the case.

More rarely some other natural phenomenon gives rise to the celebration of the change of the year, e. g. the appearance of the palolo, the favourite delicacy of Samoa: but since the palolo appears at different times near different islands, the turn of the year varies accordingly [6].

A festival of this nature is originally not a calendar fes-

[1] Junod, *Thonga*, I, 368 ff. [2] Leonard, pp. 434 ff. [3] Ellis, *Polyn. Res.*[3], I, 351. [4] Nieuwenhuis, I, 161. [5] Ellis, *Yoruba*, p. 150. [6] von Bülow, p. 239.

tival, and only on account of its special significance does it become of importance for the calendar: it is not a universal phenomenon. In different districts the position of the beginning of the year varies greatly. Among the North American Indians many tribes began the year at the spring equinox, others in the autumn, the Hopi with the 'new fire' in November, the Takulli in January [1]. The Kiowa began the year at the commencement of winter, which was signalised by the first snow-fall, or according to other statements a month earlier, with the first cold, the Pawnee with winter, the Teton-Sioux and the Cheyenne immediately before the winter [2], the Klamath and Modok in August, after the *wokash*-harvest [3], the Chocktaw of Louisiana in December [4], the Natchez in March, when they celebrated a great festival [5]. As a rule the Thompson Indians of British Columbia count their moons beginning at the rutting-season of the deer in November, but some begin with the end of the rutting-season at the end of November: others, particularly Shamans, with the rutting-season of the big-horn sheep. Many peoples of the Lytton band begin when the ground-hogs go into their winter dens. Many of the Lower Thompsons begin with the rutting-season of the mountain-goats. Some moons are called by numbers only, but those following the tenth moon are not numbered [6]. The Shuswap in the same country connected the year with the same moon as the Thompson Indians, although most of them entered their winter houses a month earlier [7]. Among the Hudson Bay Eskimos the year begins when the sun has reached its lowest position at the winter solstice [8]. The first month of the Koryak of N. E. Asia begins at the time of the winter solstice, and corresponds to our December [9]. It has already been mentioned that the East Greenlanders also began to count their months at the winter solstice, but later at the morning rising of Altair [10]. It will be seen that the beginning of the year has no common position marked out by Nature, although we may perhaps say that it

[1] *Handbook*, p. 189. [2] Mooney, *Kiowa*, pp. 366 ff. [3] Gatschet, p. 17. [4] Bushnell, p. 17. [5] Du Pratz, II, 354 ff. [6] Teit, *Thompson Indians*, p. 237. [7] Teit, *Shuswap*, p. 518. [8] Turner, p. 202. [9] Jochelson, *Yukaghir*, p. 428. [10] Holm, *10*, p. 141, and *39*, p. 105.

usually falls somewhere during the period of rest, while the peculiar natural conditions under which the Eskimos live make it easy to understand why their year should be begun with the eagerly awaited return of the sun. Among many peoples little attention seems to have been paid to the matter, since no special prominence is given to the beginning of the year, although lists of months are given. But where these lists exist, and it is desired to enumerate the months, a beginning must be made somewhere, and a fixed initial month very easily arises.

The dispute already touched upon [1] as to the beginning of the Israelitish year is very characteristic of the matter in hand [2]. It is easy to understand why no unity has been arrived at, since the conception of the beginning of the year is fluctuating and capable of many interpretations. When in the oldest codes of the law it is said of the feast of ingathering (namely of fruit, wine, and oil) that it is to be celebrated at the end of the year or that it marks the 'turning' of the year [3], Dillman is right in describing this year as an economic one. From the very beginning the feast is a feast of the end of the year [4]. Only as the agricultural year is extended into a complete year does it become a feast of the turn, and finally of the beginning, of the year.

The beginning of the agricultural year, however, still does not imply a calendar year, though certainly it furnishes occasion for the establishment of the beginning of the year when a calendar arises. Even in the year 600, at least in Gezer, no fixed series of months was known [5], the Canaanitish months not having been universally adopted. The old custom of reckoning the months from an arbitrary and accidental point of departure prevailed and long sufficed. The beginning of the year in autumn was no calendrical division, but only the conclusion of the agricultural year. When a calendar was introduced, it became obvious that this beginning of the year would also be available for the calendar. The calendar now

[1] Above, p. 234. [2] See Dillmann, pp. 914 ff., König, pp. 624 ff., and the authorities there cited. [3] Exod. XXIII, 16, XXXIV, 22. [4] Cp. above, p. 268. [5] See above, p. 234.

consists of moon-months, its beginning must therefore be a day of new moon. Since the festival of harvest, according to ancient custom, fell at the time of full moon, the festival itself could not serve as the beginning of the year, but only the day of new moon of the month in which it fell. This was the seventh month, and we do in fact find indications that the first day of the seventh month was regarded as New Year's Day; it was promoted to a feast day and was made known by the blowing of trumpets [1]. The year therefore could be reckoned from this point, and this also was done. On the other hand the numbered months mentioned above, p. 233, begin in spring with the month in which the Passover is celebrated. The beginning of the year in spring is therefore associated with the numbered months, and is contemporaneous with these: it is nothing but the starting-point of this enumeration of months. The rule for the beginning is given in Exodus XII, 2: — "This month (i. e. the Passover month) shall be unto you the beginning of months: it shall be the first month of the year to you." This reads like a prescription for a reform of the calendar, when it is remembered that in all places the Feast of the Passover was dated in relation to the month of ears *(chodesh ha-abib)*. That the numbered months did not arise till later we have already seen (p. 234). The systematising tendency which arose at the end of the kingdom of Judah, and became ever stronger during and after the Exile, necessitated a calendar. If this tendency was unrelated to practical life, it was all the more closely bound up with the religious cult. Since people were now accustomed to numbering the months, the novelty consisted in the fixing of a calendarial beginning of the year. This was suggested by the customary succession of the feasts — Passover and Feast of Unleavened Bread, Feast of Weeks, Feast of Tabernacles — and was already foreshadowed in the fixing of the date of the Feast of Weeks by counting the weeks from the Feast of Unleavened Bread. This calendar can hardly have become popular, since it must have been supplanted quite early by the Babylonian names of months,

[1] Lev. XXIII, 24.

and the popular beginning of the year in autumn has prevailed right down to the present day.

These two beginnings to the year existed side by side, at least for some time after the Exile, which is not surprising in view of what has already been said about the beginning of the year. The one is the civil beginning of the year, advanced by the structure of the calendar, the other the beginning of the series of months.

The Jewish calendar therefore arose very late, at the end of the kingdom of Judah; until that time the Jews were content with a chronology which was as primitive as that of many primitive peoples. In matters pertaining to the calendar they have always been very conservative and backward. In later times, too, they did not succeed in grasping the idea of the beginning of the year as a solitary event. König quotes on p. 644 a very significant passage from the Mishna tractate concerning the beginning of the year: — "On the first day of Nisan is the beginning of the year for the kings and for the festivals. On the first day of Elul is the beginning for the tithing of cattle. On the first day of Tishri is the beginning for the years (i. e. the civil calendar), and for the Sabbatic year and the Jubilee years, for the plants and the vegetables. On the first day of the month Shebat is the beginning for the tree-fruit." — Four New Year's Days, therefore.

Among the Jews, therefore, ecclesiastical conditions gave rise to a calendarial beginning of the year, which successfully rivalled the beginning given by the agricultural year. There is still another important type of beginning, and this depends once more upon the observation of the stars; cp. pp. 248 f. Where the beginning of the agricultural labour is determined by the Pleiades, it evidently follows that they also determine the beginning of the year. It follows further that the year lasts not only to the end of the period of vegetation, but also until the next appearance of the Pleiades, and hence the sidereal year is obtained at once with the greatest accuracy that is possible without scientific observation. This Pleiades year is especially common in South America, where there are no series of months, and in Oceania.

The Lengua Indians of Paraguay connect the rising of the Pleiades with the beginning of spring, and hold feasts during this time [1]. The Guarani of the same country determine the time of sowing by the observation of the Pleiades; it is said that they used to worship this constellation, and they begin their new year at its appearance in May [2]. In the Amazon valley the rising of the Pleiades coincides with the revival of Nature, and hence the people say that everything is renewed by these stars [3]. The Indians of the Orinoco determined the new year by the evening rising of the Pleiades [4]. But still further, the year is called by the name of the Pleiades. Certain tribes of Venezuela reckoned the year by stars, and in fact by the Pleiades. 'Year' is *tshirke,* 'star', a year = a star. The word occurs in various forms among most of the Carib tribes; among the neighbouring Caribs *tshirika* is found many times as a translation of 'the Pleiades'. The connexion becomes clear in the wide-spread Carib idiom of the Guaianas: in a Galibi dictionary 'star' and 'year' are given as *serica, siricco,* the Pleiades as *sherick,* and we read in brackets: "The return of the Pleiades above the horizon together with the sun forms the solar year of the natives." Among the island Caribs the Pleiades are called *chiric;* these people reckon the years in 'Pleiades'. Among the Arawak *wijua* means 'Pleiades', 'star' in general, and 'year', since they reckon the year from the point at which they see the Pleiades rise after cock-crow. The Cariay of the Rio Negro call the Pleiades *eoünana* and the year *aurema-anynoa,* which seems to be a development of the former word. The Guarani call the Pleiades *eishu,* 'bee-hive', and the year has the same name; in ordinary life however the year is usually known as *roi,* 'cold' [5].

The Caffres recognise the time of sowing by the position of the stars, especially the Pleiades, and reckon the new year from the morning rising of the latter [6]. Although the Amazulu call the feast of the first-fruits the new year, they say at the

[1] **Grubb, p. 139.** [2] Liebstadt, quoted by Frazer, p. 309. [3] Teschauer, **p. 736.** [4] **Gumilla,** quoted by Frazer, p. 310; cp. Gilij, above, p. 49. [5] **von den Steinen in *Globus,*** from old sources difficult of access and in part in **manuscript.** [6] **Kidd, quoted by Frazer, p. 116.**

appearance of the Pleiades: "The Pleiades are renewed, the year is renewed", and they begin to dig [1]. In Bali the appearance of the Pleiades at sunset marks the end of the year [2]. In Bambatana (Solomon Islands) the year is reckoned by the Pleiades [3]. Among the Polynesians the Pleiades year was extremely wide-spread. The inhabitants of the Marquesas Islands had a ten-month year, but were acquainted with a year of twelve months, which they called by the name of the Pleiades, *maka-ihi* or *mata-iti,* 'the little eyes' [4]. On Hervey Island the new year was given by the evening rising of the Pleiades in the middle of December [5]. In the Society Islands there were two seasons named after the Pleiades. The first, *matarii i nia,* 'little eyes above', began at the evening rising of these stars and continued as long as they were visible in the sky in the evening; the other *matarii i raro,* 'little eyes under', began after the evening setting and extended over the time during which the stars were not to be seen in the evening [6].

It follows that a fixed beginning of the year does not exist universally, and therefore is not the general norm. The beginning of the year in our sense is the starting-point of the series of the days of the calendar; among the primitive peoples it is the beginning of any year, whether the complete year or the phenomena of the time of vegetation only. There are several such phenomena appearing side by side, so that there can also be several beginnings to the year, e. g. several feasts of first-fruits, as among the Thonga, the rising of the Pleiades and the feast of the first-fruits among the Amazulu. When one phenomenon of this kind, e. g. the corn-harvest, prevails over the others and is perhaps brought into prominence by the greatest festival of the year, it appears more like our New Year, though the significance of the occasion does not depend, as among ourselves, upon the position of the day in the calendar, but upon the natural conditions. And when a phase of the stars, e. g. of the Pleiades, coincides with the beginning of the agricultural year and the renewal of Nature, the stellar (Pleiades) year is obtained by comprising the time between one

[1] Callaway, p. 397. [2] Friederich, p. 86. [3] Thurnwald, p. 342. [4] Mathias G., p. 211. [5] Ellis, *Polyn.Res.* [3], I, 312. [6] *Ibid.*, p. 87; Wegener, p. 147.

rising or setting and the next. By this means we arrive at the pure but undivided solar year. On the other hand the phases of the stars, like the other natural phases, were needed to determine the months, and here the result was more important.

With regard to the intercalation, the equalising of the total number of moon-months and the solar year, the problem first arose when there had been developed a fixed series of months which it was desired to repeat without interruption. Then arose the necessity of introducing an occasional month into the series of twelve months, or omitting one from the series of thirteen, so that the months named from natural phases might remain in their proper places. This difficulty was first of all blended with that arising from the fluctuation of the natural phases due to the varying climatic conditions of different years. The expedient was crudely empirical, the occasional leaping over or addition of a month. Gradually it became the custom to introduce the intercalary month at a definite point; it may also be associated with a so-called 'vacant period'. Where a month was named from a phase of a certain star, the correction was given automatically by this phase, since this month was fixed. The intercalary month obtained its place before this month, which became the beginning of the year, since the reckoning started with it. By this means was given a lunisolar year which was however empirically regulated by occasional intercalation.

APPENDIX: THE EGYPTIAN YEAR.

Upon the quite peculiar Egyptian time-reckoning I have only a few remarks to make by way of addition to the clear and convincing account of its origin given by Eduard Meyer; as to the disarrangement of the names of months familiar to us, which are borrowed from festivals, I must admit I am not quite clear, but this matters little for our present purpose since these names are more than two thousand years younger than

the introduction of the year. The Egyptian year consists of three seasons — time of inundation, seed-time, and harvest — each of four months containing thirty days each, together with five additional days, the epagomena, standing outside the year and theoretically not included in it. The month is therefore the round month and the year the round year, which by multiplying the round number of the months in the year by the round number of days in the month gives a total of 360 (12×30) days. The use of round numbers in the arithmetical application of the calendar is familiar in all quarters of the world and has been known at all times; it is continued in the practice of our modern banks in calculating interest *à l'usance*. The surprising thing is that in Egypt no notice should have been taken of the moon, and that the month should have been carried through as a mere numerical unity. For at the stage of knowledge presupposed by the regulation of the calendar the Egyptians must have known that the number of days in the moon-month varies between 29 and 30. I am therefore inclined to think that this form of year was first introduced as a means of counting in administration and the making of returns, and then by degrees established itself as the civil calendar because the rural life was so closely dependent upon the administration and its accounts. We may compare the fact that the lunisolar calendar of Greece was introduced as an ecclesiastical calendar, and succeeded in establishing itself as the civil calendar owing to the close connexion between the religious and the political life; but the old reckoning from the phases of the stars persisted alongside of it. In the same way we must suppose that in Egypt alongside of the numerical calendar the old method of reckoning by the concrete appearance of the moon originally persisted, but since by this time it had lost its practical importance it vanished without leaving any other traces than the length of the arithmetical month (as a round number) and the name 'month'.

On the other hand it must have been intended to give to the year the length of the solar year: the five extra days were accordingly introduced outside the series of months. Hence the same word *wepet ronpet* means both the first day of the

civil shifting year and also the day of the actual morning rising of Sirius; hence too the three four-month divisions of the shifting year are called after the seasons. The first of these, the time of inundation, began exactly with the morning rising of Sirius when the Nile began perceptibly to rise. Here the Egyptians went wrong because they did not realise that the year does not consist of exactly 365 days, but contains an additional fraction of a day. The consequence was that the Egyptian year got out of place in relation to the solar year, but so slowly that no inconvenience was caused in practical life: the linguistic difficulty, that *wepet ronpet* acquired two different meanings, and that e. g. the season called the time of inundation might fall in the actual seed-time or harvest, the conservative minds of the Egyptians enabled them to tolerate. A contributing factor was the practical convenience of the calendar. The dislocation must however very soon have been recognised, since the actual morning rising of Sirius, so far as we know, was always celebrated, i. e. it was a movable feast in relation to the calendar. The error is included in the well-known formula of the Sothic period (1461 Egyptian = 1460 Julian years).

The knowledge of the closest approximation that can be made to the correct number of days in the year, reckoning only whole days, can only be arrived at in one of two ways, either by the observations of the solstices and equinoxes, which is the method adopted e. g. by the Hopi, or by means of the rising of a star. The duration of the solar year is not reached by way of the lunisolar year. Which of the two methods the Egyptians adopted is not in doubt. No notice has come before me which suggests that the Egyptians observed the position of the sunrise or sunset on the horizon, while the stars on the other hand were accurately observed by them. There are calendars which give the position of the constellations in accordance with which the hours of night were determined and proclaimed [1], and in particular the morning rising of Sirius was at all times observed and celebrated. This is primitive [2],

[1] Ed. Meyer, *Chron.*, p. 20. [2] Cp. above, pp. 248 f., and especially the Sothic year, pp. 274 ff.

but not so the counting of the days between two risings. The latter process would be facilitated if the reckoning was previously carried out in numerical months of 30 days (naturally as a round number, not as an actual month); perhaps this was the first stage. The calendar therefore, as Ed. Meyer has specially pointed out, must have begun to run its course in a year in which the rising of Sirius and New Year's Day coincided, i. e. it began with a Sothic period.

The months within each season are numbered from I to IV. Among primitive peoples it frequently happens that a season gives its name to two months, which are distinguished as the first and second, but a numbering such as that of the Egyptian calendar is unexampled and shews once more a desire to get away from the moon-month. The so-called 'months' are rather subdivisions of the seasons.

The breach — and it can be considered no less — with the primitive time-reckoning is part negative, part positive. Positively, the length of the solar year in whole days has been astonishingly early recognised, but the greatest advance is in the negative direction. The calendar has been detached from the concrete phenomena of the heavens: thereby it acquires a numerical character, and only so is the genuine time-reckoning created. For in practice it is more necessary to be able to reckon conveniently than to remain in accurate agreement with the incommensurability of the motions of the heavenly bodies. Hence the Egyptian calendar held good, although its year was a shifting year and in spite of the fact that the ideal year underlying it was a sidereal and not the actual solar year, and the Greek astronomers reckoned by it on account of its convenience, just as our astronomers still reckon by the Julian calendar. The Egyptian year therefore lies at the bottom of our year, which has been altered so as to remain in agreement with the seasons, — this being necessary in view of the spread of the historic sense among the people — but has also unfortunately been spoiled in the division into months, owing to the influence of the Roman months. The Egyptian calendar is the greatest intellectual fact in the history of time-reckoning; like all the greatest achievements

of this nature, e. g. the alphabet, it was attained through a radical simplification, in which also practical convenience played a great part. It should not be forgotten that astronomy and the calendar are not identical. In matters of the calendar practical utility is more welcome than refined astronomical calculation.

CHAPTER XI.

POPULAR MONTHS OF THE EUROPEAN PEOPLES.

In ancient times, and even at the present day in lands which lie outside the path of the great leveller, civilisation, the months taken over with the Roman calendar are not numbered divisions of the year, the names of which are a matter of indifference, but are concretely conceived and named as seasons. They are, in fact, nothing but seasons, the number and duration of which are determined by the conventional calendar. The striving after concreteness which characterises not too highly civilised man leads to the abolition of the obscure and unintelligible Roman names of months, and the substitution of other names describing the season, or more rarely taken from some great festival falling within the month. Only the Hungarian months are entirely named after ecclesiastical festivals [1]. It is also found that the Latin names are as far as possible rendered intelligible by popular etymology.

These statements are well illustrated by the names given to the months by the Greek peasants of Macedonia. It is said of the latter that they measure time not so much by the conventional calendar as by the labours and the festivals characteristic of the different seasons. Seed-time, harvest and vintage, the feast of Saint George, the midsummer fires are some of the notable occasions in the life of the peasant, and these have impressed themselves upon the names of the months. The names are: — 1, *Γενάρης*, derived from *γεννοῦν*, also called *μεγάλος* or *τρανὸς μῆνας* in opposition to February, and *Κλαδευτής* on account of the pruning of the vines; 2, *Φλεβάρης*, 'Vein-

[1] Grimm, p. 105.

sweller', the veins (*φλέβες*) of the earth are swollen with water (cf. the English folk-name for this month, 'February fill-dyke'), or *μικρὸς μῆνας, κουτσοφλέβαρος*; 3, *Μάρτης, ὁ φουσκοδενδρίτης*, 'the tree-sweller', *Γδάρτης*, 'the flayer', on account of the bitterly cold wind; 4, *Ἀπρίλης, Ἁγιογεωργίτης*, from the feast of Saint George on the 23rd; 5, *Μάης*; 6, *Θεριστής*, harvest month; 7' *Ἁλωνισιής, Ἁλωνάρης*, threshing-floor month; 8, *Αὔγουστος*; 9, *Τρυγητής*, vintage month, *Σταυριώτης*, from the Feast of the Exaltation of the Precious Cross, held on the 14th; 10, *Ὀχτώβριος, Ἁγιοδημητριάτης*, from the feast of Saint Demetrios on the 26th; 11, *Σποριᾶς*, sowing month, *Ἀντρεάς*, from the feast of Saint Andrew on the 30th; 12, *Νικολαίτης*, from the feast of Saint Nicholas on the 6th [1].

The Albanian names of months are similar: — 1, T(osk) *Jennári*, G(heg) *Kalendoúri*, New Year month *(Kalendae)*; 2, *Skourti*, i. e. 'short'; 3, T. *Marsi*, G. *Frouri*; 4, *Prilí*; 5, *Maji*; 6, *Korríkou*, harvest month; 7, T. (*'A*)*lonári*, 'threshing-floor month' (a Greek loan-word), G. *Kjérsouri*, probably 'cherry month'; 8, *Gósti*; 9, *Bjéstea*, autumn month, literally 'bare month', also *bjést' epáre*, first autumn; 10, *se Mítre*, month of Saint Demetrius, also *bjest' e dýte*, second autumn; 11, T. *se Mexíl*, month of St. Michael, G. *se Merí e Strougyes*, month of the Virgin of Struga, also *bjest' e tréte*, third autumn; 12, *se Nderé*, month of St. Andrew [2].

The various Celtic series I omit [3], since they are very obscure and no new material is at my disposal; I shall only remark that they shew a mixture of distorted Latin and of native names, the latter being taken, at least in part, from the phenomena of the vegetation. The Basque names of months are: — 1, New Year month or black month; 2, bull or wolf month; 3, tepid month; 4, weeding or fasting-bread month; 5, leaf month; 6, seed-time *(sic!)*, bean or barley month; 7, harvest or wheat month; 8, month of drought; 9, fern or ear month; 10, gathering month; 11, sowing month or forest-clearing; 12, binding up of vegetation(?). They refer therefore throughout

[1] Abbot, pp. 11 ff. [2] von Hahn, II, 111. [3] Grimm, pp. 101 ff.

to the vegetation and to agriculture. For four months the Latin names are also in use [1].

I have purposely placed in the foreground these mingled series arising in modern times, since they shew how little the people can reconcile themselves to the unintelligible Latin names, and how the latter are crowded out by native names which by their relation to seasons, occupations, and festivals offer points of reference easy to remember. The months are nothing but seasons, the length and situation of which are regulated by the Julian calendar.

The Lithuanian and Lettish names of months refer exclusively to natural phenomena and the occupations of agriculture. The Lithuanian series is: — 1, unexplained; 2, jackdaw month; 3, dove month; 4, birch month, or birch water-flowing; 5, cuckoo month; 6, fallow or sowing month; 7, linden month; 8, hot month or rye-cutting; 9, autumn month; 10, leaf-fall; 11, month of clods; 12, month of dryness (frost). The Lettish names are: — 1, winter month; 2, snow or fasting-month; 3, dove or snow-crust month; 4, birch-sap month; 5, leaf month; 6, fallow or blossoming month; 7, hay or linden month; 8, rye month or dog (-days); 9, heath-blossom month; 10, autumn month; 11, frost month; 12, wolf month or Christmas [2].

Very similar but much more numerous and fluctuating are the names of months among the Slavonic peoples, collected by Miklosich along with the names of months of a number of other peoples. Yermoloff in his great work on the popular Russian calendar gives only a limited number of names, and these are rarely translated: with a few exceptions these names will be found in Miklosich. The latter writer has classified and discussed the names under their proper headings as follows: — (1) names taken from the vegetable kingdom, 18 in number; (2) from the animal kingdom, 9; (3) from natural phenomena in general, 17; (4) from periodically recurring actions, 10; (5) from customs and festivals, 25; in addition to which there are a few unexplained and three Latin names. Since it is my purpose to give an idea not only of the variety of the names but also of the fluctuating relationship with the Julian months,

[1] Grimm, p. 104. [2] Grimm, pp. 98 ff.

I arrange the material of Miklosich's first four groups according to the months, omitting isolated and uncertain names. If the statement as to the corresponding Julian month in Miklosich is not clear, I add a mark of interrogation. I am also indebted to Prof. G. Kazarow of Sofia for detailed information as to the Bulgarian names of months, and for extracts from the Bulgarian work of Kovatschev on popular astronomy and meteorology; these sources are referred to respectively as Kaz. and Kov. An asterisk prefixed to the name of a month means that the same name is given to another month also; if prefixed to the abbreviation denoting the country, the asterisk shews that the name is given to two different months in that country. The names refer to: — 1, *January,* *'month of clods', Czech, since the hard frost turns the earth into clods; 'ice month', Czech; *'increasing of the day-light', Old Bulg., Slovak, Croat.; 'cold month', Pol., Bulg.; *'the Cutter', Slovak, Bulg., Serb., which Miklosich rightly refers to the felling of trees, Yermoloff and others less well to the piercing cold; 'the Great Cutter', Bulg.; *'kindling of the wheel', *Bulg. (Kaz.) [1]. 2, *February,* 'the Side-warmer', Russ. (Yermoloff), *latera calefaciens,* i. e. the time when the cattle leave their stalls in order to warm themselves in the open (Miklosich); 'the savage month', Ruthen., Pol.; *'the dry month', *Slovak; 'the snowy month' [2]; 'wedding month', Old Russ. [3]; *'the Cutter', Old Bulg., Croat.; 'the Little Cutter', Bulgarian. 3, *March,* *'birch month', Slovak, Ruthen., refers to the sap of the birch which now begins to flow; *'grass month', *Slovak; 'time of deceitful weather', Bulg.? Serb.? Old Bulg.; *'the dry month', Old Bulg., *Slovak, Croat.; 'beginning of summer' (*lětnik,* Kaz.). 4, *April,* *'birch month' (in three different forms), *Old Bulg., Ruthen.; *'blossoming month', *Croat., Ruthen., Pol.; 'oak month', Czech, because the oak comes into leaf; *'grass month', *Slovak, *Croat., *Serb.; 'the Liar', or 'the month that deceives the grass', Bulg., *(lážko, lăži-trev,* Kaz.); 'the Fleecer', 'the Fleece-seller', Bulg. (Kov.,

[1] *koložeg,* also December. The name cannot be taken as referring to the disc of the sun; popularly it is said that once it was so cold during this month that the people had to burn even their waggons in order to warm themselves. [2] Yermoloff, p. 54. [3] According to Yermoloff, p. 428, October.

cf. Greek *γδάρτης*). 5, *May,* *'blossoming month', Slovak, *Croat., Czech, Bulg. (Kov.); *'rose-blossoming month', High Sorb; *'grass month', Old Bulg., *Slovak, *Croat., Ruthen., Czech, Bulg.; 'cornel month', Sloven.; 'maize-hoeing', Bulg. (Kov.); *'cherry month', Bulg. (Kov.); *'cochineal month', Bulg. (*červenijat,* Kov.). 6, *June,* 'beanblossoming month', Slovak; *'cherry month', Serb., *Bulg. (Kov., cf. the Albanian July); 'month of ears', Slovak; *'linden month', 'Slovak, Serb., since the linden blossoms then; *'rose-blossoming month', Low Sorb, Czech; 'Mower', Bulg. (Kov.); 'hay-cutting', Bulg. (Kaz.); *'cochineal month', Ruthen., Bulg., Czech, because the cochineals used for red dye are then collected; 'grasshopper month', Old Bulg.; 'milk month', Slovak; 'fallow month', Slovak, High Sorb. 7, *July,* *'linden month', Ruthen., Pol.; *'cochineal month', Old Bulg., Pol., Czech [1]; 'the hot (month)', Serb., Slovak, Bulg.; 'hay month', Ruthen., Bulg., Russ.; *'cutting month', Czech, refers to the hay-cutting; *'harvest month', Low Sorb; 'the Harvester', Bulg. (Kaz.); *'sickle month', Old Bulg., Slovak, Serb., Bulg. (Kov.). 8, *August,* 'month of ripeness', Russ.; *'sickle month', Ruthen., Czech, Pol.; *'cutting month', in Moravia and among the Slovaks; 'barley month', Low Sorb; *'harvest month', High Sorb, Bulg. (Kaz.); 'threshing-floor month', Bulg. (Kov., cf. Greek-Albanian *Ἀλωνάρης*); 'fruit month', Bulg. (Kov.); *'gadfly month', *Slovak, Ruthen.; 'beginning of the lowing' (i. e. the rutting of the deer, *zarev*), Old Bulg.; 'time when people are carting' (no doubt on account of the bringing in of the harvest), Slovak, Serb.; 'dryer up of the rivers', Bulg. (Kov.). 9, *September,* 'sowing month', Bulg. (Kov.); 'month of gathering', Bulg. (Kov.); *'heath-plant month', Old' Bulg., Pol., Ruthen., (Czech, July or August); *'time when the goats rut', *Slovak; *'gadfly month', *Slovak; 'the gloomy month', Old Russ. [2]; *'month of lowing', 'of rutting', *(záži)* *Czech, (*rujan,* and kindred words) Old Bulg., Serb., Bulg., Old Russ., Czech (earlier); 'gathering of the clusters', Bulg.; 'month of the (winter-) sowing', Ruthen.; 'old women's summer', Ruthen., Pol. (?); 'autumn', Russ., Slovak.

[1] The Czechs have for some centuries distinguished *červen* and *červenec* as June and July respectively, or also: — 'the little č.' = June, 'the great č.' = July. [2] Yermoloff, p. 394.

10, *October*, *'leaf-fall', Old Bulg., Serb., *Bulg. (Kaz.); 'the yellow (month)', Ruthen.; *'time when the goat ruts', *Slovak; *'month of the lowing' *(říjen),* Czech (present day); 'time of flax-preparing' (the name comes from a term for the waste products of the flax), Ruthen., Pol.; 'vine month', Slovak, Serb.; 'gathering of the maize', Bulg. (Kov.); 'month of dirt', Russ.; 'the autumnal (month)', Bulg. (Kaz.). 11, *November,* *'leaf-fall', Slovak, Ruthen., Czech, Pol., *Bulg. (Kov.); *'time when the goat ruts', *Slovak; *'month of clods', Old Bulg., Russ.; 'threshing month', Low Sorb. 12, *December,* 'wolf month', Czech, High Sorb (rutting-time of the wolves); *'month of clods', Slovak, Croat., Ruthen. (?), Pol.; *'increasing of the day-light' (?), Serb., Russ.(?), Czech; 'month of the snow-storm', Ruthen.; 'winter month', Bulg. (Kov.); *'kindling of the wheel', *Bulg. (Kov., see above). More rarely the festivals give their names to the months. This is the case with Christmas, Candlemas, All Saints' Day, the festival of the birth of the Virgin, and the feast of the Rosalia (= Whitsun), Slovak, Bulg. (Kaz.), and with 14 saints' days, e. g. *Martinzi,* November, Bulg. (Kov.). With regard to Bulg. *gorêštnik* (= July) Kazarow writes to me: "*gorêšt* = 'hot'; in July the people celebrate a fire-festival of three days' duration, viz. the 15th, 16th, and 17th of July, *gorêštnici*". Of the Latin names of months only three have been borrowed: -- *May* (common), Slovak, Croat., Ruthen., Russ., Czech, Pol., Sorb; more rarely *April,* Old Bulg., Sorb; and *March,* Croat., Serb., Ruthen., Pol., High Sorb.

The great majority of the names refer to natural phenomena and country occupations. The variety of the series need not be specially pointed out, the numerous asterisks shew the fluctuation and variation of the nomenclature between two or even three months. Much is explained, as is indicated by the mention of the countries in which the names originate, by the extremely various climatic conditions prevailing in the countries occupied by the Slavs, and a further explanation of the variety is to be sought in the well-known phenomenon that when the seasons correspond only imperfectly with the months, the equalisation is carried out sometimes with one month, sometimes with another. It must be so, since among the same people

the same name describes various months. Pairs of months are however rare: 'the big' and 'the little' *sêčko* (January and February), Bulg.; 'the little grass-month' (March) and the 'big' one (April or May), Slovak; the little and big 'cochineal' months (June and July), Czech, distinguished in the calendar of to-day as *červen* and *červenec* (diminutive), so that the names have changed places; and *žătvar,* 'reaper' (July) and *žătvarskijat,* 'harvest-month' (August), Bulgarian (Kazarow). Here also must be placed *zarev* and cognates, Old Bulg., Russ., Czech, which is inchoative and means 'beginning of the lowing (the rutting)', and *rjujin* and cognates, Old Bulg., Slovak, Serb., Old Russian, Czech, 'the lowing', i. e. the full rutting and therefore the second rutting-month. The character of all these names is only too obvious. Hence the fact that the word for month is very rarely added, though it appears in the translation. These names have proved so vigorous that in Czech and Polish they have ousted the Latin names (with the exception of May).

In the same way I give a summary of the German names of months, from the abundant compilations more particularly of Weinhold and Ebner. Here too I make no claim to completeness, — some names have been deliberately omitted — my purpose being only to give an idea of the variety and instability of the names. To this end I choose the forms which are most easily intelligible.

1, *January:* — bare month (the bare, naked month), *hard month, *winter month, ice month, *wolf month, threshing month, month of calves, 'Great Horn', **Volborn, Lasmaend, Laumonat* (the last three unexplained). 2, *February:* — last winter month, wood month, fox month, 'Little Horn', *Hornung, *Volborn, Rebmaend, Redmaend, Selle (maend), Sporkel, Sprokkelmaend.* 3, *March:* — (first) ploughing month, drying month, *spring month, sowing month, pruning month, vernal month, spring. 4, *April:* — second ploughing month, *spring month, grass month, shepherds' month, cuckoo month, the rough month *(Rûmaend).* 5, *May:* — ass month, month of joy, month of flowers, bean month. 6, *June:* — fallow month, *dog month, rose month, pasture month, *Lusemaend (Luse* probably = modern German *Schildlaus,*

'cochineal'), summer month, fallow. 7, *July:* — (first) **Augst*, hay month, *dog month; *Heuet* (hay-harvest), **Arne* (harvest), *cutting (i. e. of the hay). 8, *August:* — (second) **Augst*, harvest month, *Arnemaend*, cutting month, *Kochmaend*, month of fruit, *Bîsmaend* (when the cattle, tormented by the heat and the flies, run about *(biset)* the fields as if mad), **Arne*, *cutting. 9, *September:* — second *Augst*, *Augstin*, cutting of oats, (*first) *autumn month, *sowing month, spelt month, barley month, boar month, **Fulmaend*, *Laeset*, *Hanfluchet*, bean-harvest, first autumn, over-autumn, autumn sowing. 10, *October:* — (*first or *second) *autumn month, first winter month, *sowing month, *slaughtering month, **Folmaend*, *Aarzelmaend* (since the year turns back), (second) autumn, **Laupreisi* (leaf-fall). 11, *November:* — (*second or third) *autumn month, *winter month, *Laubryszmaend*, leaf month, month of rime, month of winds, month of dirt, *hard month, *slaughtering month, *Smeermaend*, *full month, *wolf month, acorn month, **Laupreisi*. 12, *December:* — fourth autumn month, (second) *winter month, *hard month, *slaughtering month, month of bacon, *wolf month, hare month, second winter. There are also many names borrowed from feasts and saints' days, such as (New) Year month and the synonymous *Kalemaend* = Calends month(January), *Fassnachtmaend* or *Olle Wiwermaend* (February), *Klibelmaend* (Conception of the Virgin, March), Holy Month or Christ Month. The Latin names March, April, May, and August have also become very popular; the last-named has for special reasons been included in the above list [1].

The history of the German names of months has been elucidated by Weinhold and for the Alemannic district by the work of Ebner, who bases his researches upon extensive in-

[1] The much-disputed name *Hornung* is rightly explained by Bilfinger, *Bes. Beil. des Staats-Anzeigers f. Württemberg*, 1900, pp. 193 ff. It describes the month as 'the one that has been curtailed of its rights' (cf. Icel. *hornungr*), since it has fewer days than the others: cf. the Flemish term *het kort mandeken*. The same writer, *Zts. f. deutsche Wortforschung 5*, 1903, pp. 263 ff., satisfactorily explains *Sporkel* as the month in which the vines are pruned; the name *Rebmonat* has the same sense. Further he conjectures that as November is the slaughtering month and *Louwmaend* (= January) is the tanning month, *Sellemaend* takes its name from the sale of the hides.

formation collected among the people. As early as the time of Charlemagne a German series of months had been created in order to bring the Julian months more closely home to the people, so that the list was based largely upon a popular foundation. The names are: — *Wintarmânoth, Hornunc, Lenzinm., Ostarm., Wunnim., Brâchm., Hewim., Aranm., Witum., Windumem., Herbistm., Heilagm.* This series attained great influence, but did not become universal; on the contrary it was subjected to alteration under the pressure of the agricultural terms. In spite of this early attempt at unity the German names for the months shew once more the variety and fluctuation with which the reader is now sufficiently familiar. A special interest attaches to the fact that the sources make it possible to follow how the names of months arise from the simple terms for the seasons. On this point Weinhold says, p. 2: — "In our sources the general statement *in der erne* ('in the harvest') preponderates over the month-name *ernemanot* ('harvest-month'); *im brâchet* ('in the fallow'), *im höuwet* ('in the hay-harvest') hold their own alongside of *brâch-* and *höumonat* ('fallow-, hay-month'), *im winmot* ('in the vintage') persists, since *windumemânot* ('vintage-month') had long since died out. From the phrases *in der sât, in dem snite* ('in the sowing', 'in the cutting') are painfully evolved a *sâtmân* and a *schnitmonat* ('sowing-, cutting-month'). We find autumn and winter as names of months, and also the non-German *augst,* divided into three; we can see the uncertainty with which *laubbrost* and *laubrîse* ('sprouting and falling of the leaves') contract into names of months." Accordingly the above list shews that alongside the names compounded with 'month' the simple terms from seasons and occupations of the year are frequently found as names for the months. March = *Lenz* (spring), June = *Brachet* (fallow), July = *Heuet* (hay-harvest), August = *Arne* (harvest), September = *Bonenarve, Hanfluchet, erst Herbst, Herbstsaat, Überherbst, Laeset (Lesezeit)* (bean-harvest, hemp-gathering, first autumn, autumn-sowing, late autumn, harvest time), October = *ander Herbst, Herbst, Laupreisi* (second autumn, autumn, leaf-fall), December = *ander Winter.* Of great significance is the state of affairs found in the Alemannic sources

of the 14th century [1]; side by side with the compound forms the simple often appear, but always as definite names of months. Towards the end of the century they then begin to have a loose connexion with the conception 'month', e. g. *brachot der manod* ('fallow the month'). This shews the method by which these names have become names of months, and Ebner judges the process quite correctly when he says that the definite names of months were only secondarily evolved from the general time-indications. He adds: — "This observation can often be made in the sources, viz. that alongside of the month-name which exactly circumscribes a lunar period (*sic!*, must be 'a Julian month') a simple conception of time also appears. These simple terms, such as 'autumn' for September, also appear as general time-indications, especially in the old laws. They originally have this character, and they shew it even to-day. Little by little they become stereotyped into fixed names of months, and enter into association with the conception 'month'. In this sense as definite names of months the simple terms live for a long time in the sources alongside of the full terms (those with 'month'), but in the end lose their force as definite names of months; to-day they are in dialects general time-indications" [2]. There is therefore an attempt to render popular the unfamiliar Julian divisions of the year by giving them popularly intelligible names; Charlemagne by his series of months had already tried to systematise the process. The same phenomenon shews itself in the single fragment of a Gothic calendar which has come down to us, where November is equated to *fruma jiuleis*.

The fact that the people regarded the months as seasons, and did not clearly distinguish them from the latter as divisions of time with a definite number of days, has sympathetically affected those Latin names which became really popular. When we hear of a 'first' and a 'second' May, the name is evidently loosely regarded as a general term for the early summer. *Augst* comes to mean simply 'harvest' [3]; hence July is called 'the first *Augst*' and August 'the second *Augst*', or

[1] Ebner, p. 9. [2] *Ibid.*, p. 5. [3] Weinhold, *Mon.*, pp. 31 ff.

the latter is named *Augst* and September is called *Ander Augst, Augstin,* or *Haberaugst* (oat-harvest).

This explanation is opposed by the statement of Tille that in primitive Germanic times there were sixty-day divisions [1] from which the pairs of months have arisen, and that the fluctuation in the names of months is due to the fact that these divisions of time began in the middle of the Julian month [2]. The fluctuation in the names of months is shewn by the frequent asterisks in the above list, and the pairs of months are: — big and little *Horn* [3], the first and second ploughing month, the first and second May, the first and second *Augst,* or *Augst* and *Augstin* or *Haberaugst,* and first and second autumn. Our researches ought to make a special refutation of Tille's thesis unnecessary. Obviously the seasons never had a definite number of days before they became names of months; both phenomena find their explanation in the indeterminate length and position of the seasons upon which the scheme of the Julian months was superimposed. Accordingly, where the name of the month was taken from a longer season, the people counted three or four months with the same name. Thus October and November are called respectively third and last autumn month, December is fourth autumn month, February third or last winter month.

The German names of months were in great measure genuinely popular, — their very multiplicity, which has its roots in the life of the people, suffices to prove that — but they have had to give way to the Latin names in spite of the attempts made in modern times in the popular calendars, and especially under the influence of Romanticism, to establish them throughout. In our own day they persist in popular usage chiefly in Switzerland.

The Anglo-Saxon months are preserved in a well-known passage of Bede [4]. I give each name with the explanation. 1, *giuli;* 2, *solmonað: mensis placentarum, quas in eo diis suis offerebant;* 3, *hreðmonað: a dea illorum Hreða;* 4, *eosturm.:*

[1] Above, p. 77. [2] Tille, pp. 19 and 15. [3] This pair is evidently to be explained otherwise: cp. Bilfinger, above, p. 289, note 1. [4] Beda, *De temp. rat.,* c. 15.

a dea illorum, quae Eostre vocabatur; 5, *þrimilci: quod tribus vicibus in eo per diem pecora mulgebantur;* 6, *liða;* 7, *liða: blandus sive navigabilis;* 8, *weodm.: mensis gizantorum* ('weeds'), *quod ea tempestate maxime abundent;* 9, *halegm.: mensis sacrorum;* 10, *wintirfyllið: composito novo nomine hiemeplenilunium;* 11, *blotm.: mensis immolationum;* 12, *giuli: a conversione solis in auctum diei.* Of the explanations of Bede some are obvious, others doubtful. For instance one would rather connect February with the word *sol* = 'sun', or perhaps with *sol* = 'dirt' (on account of the melting of the snow), since no word *sol* = 'cake' is known. The goddesses Hreða and Eostre, who formerly played a great part in mythological discussions, are now with reason suspected as being an explanation of Bede's. *Hreðmonað* is 'the rough month' [1], *hreðness* is 'roughness', especially of the weather; the name is therefore equivalent to the second term for the same month, *hlyda* (see below). In the case of *eostur* one might think of some lost name of a season which, like *giuli,* was transferred to a Christian festival. For *halegmonað* and *wintirfyllið* see below; *blotmonað* is the slaughtering month; the explanation of *giuli* is fatally wrong.

A calendar in Bibl. Cottoniensis, assigned by Hickes to the year 1031, has the same names, but unfortunately, on account of damage caused by the great fire, nos. 1, 7, 9, and 12 are missing [2]. The *Menologium Poeticum* [3] does not translate all the names. The series is: — Januarius, Februarius or *solmonað,* Martius or *hlyda, Aprelis monað,* Maius, Junius or *ærra liða, Julius monað,* Augustus or *weodmonað,* September or *haligmonað,* October or *winterfylleð,* November or *blotmonað,* December or *ærra jula.* There are missing therefore, probably not by accident, *eostermonað* and the second month of each of the pairs. Finally I give the list compiled by Hickes: — 1, *æftera geola;* 2, *solmonað;* 3, *hlyda* or *hlydmonað* ('the loud, blustering month', on account of the storms); 4, *easterm.;* 5, *maiusm.;* 6, *serem., midsumorm., ærra liða, Juniusm.;* 7, *neðm.,*

[1] This interpretation however involves the difficulty that *hreðe* is usually written without *h* (Ekwall). [2] Hampson, I, 422 ff. [3] *Bibl. der angelsächs. Poesie, herausgeg. v. C. W. M. Grein,* II, Göttingen, 1858, pp. 1 ff.

mædm. (hay-harvest month), *æftera liða, Juliusm.*; 8, *weodm., Augustusm.;* 9, *haligm., harvæstm.;* 10, *se teoðam., haligm.;* 11, *blotm.;* 12, *midvinterm., ærre geola* [1]. Of these variants upon Bede's list *harvestm., hærfestm.* occurs frequently and indeed is attested from the year 1000. In Robert of Gloucester (1297 A. D.) the word means August [2]. The two others are doubtful: they appear in the first edition of Bosworth's Anglo-Saxon Dictionary, which Weinhold used, but are absent in the second, doubtless because the sources are unknown. As far as I can see they come from Hickes, they are missing in Hampson's Glossary. The Oxford Dictionary says, s. v. *meadmonth:* "an alleged O. E. name for July". Of *seremonth* it gives a late example, where the word is equivalent to August [3]. It is possible that Hickes used sources which have perished in the fire at the Bibliotheca Cottoniensis. The form *searmonað,* so far as I know, appears only in Bosworth, and is perhaps a normalising of the spelling. The name 'dry month' (mod. Eng. 'sear', 'sere') corresponds as badly as possible to June, and is not much more suitable for August. A satisfactory explanation would be given if, as Prof. Ekwall proposes to me, we assume that *seremonað* = *sceremonað, s* being often written for *sc* from the 12th century onwards; the name would then mean 'sheep-shearing month'. Fluctuation in the names of months is seen here also: *haligmonað* means September or October, *harvest-monað* both August and September. So far the Anglo-Saxon months present the usual characteristics in the nomenclature, and in the fluctuation of the names. A point worthy of note is the agreement in name with the Gothic *fruma jiuleis* but difference in position: this is explained by the fact that *jiuleis, giuli, jul* is an old word for a shorter season.

Bede's further statements as to the Anglo-Saxon year are very important and have been much disputed. He represents it as a lunisolar year with lunar months. It began on Dec. 25th; this night the heathens called *modra nect, id est matrum noctem ob causam, ut suspicamur, ceremoniarum quas in ea pervigiles agebant* ("that is the night of the mothers, because,

[1] Hickes, I, 215. [2] The quotations are given in the Oxford Dictionary; see further Hampson, II, 194. [3] Aubrey, *Rom. Gentilisme,* 1686—7.

as we suppose, of some ceremonies which they performed in the night"). In an ordinary year each season had three months, in leap-year the thirteenth month was intercalated in the summer, it was a third *liða* and a year of this kind was called *annus thri-lidi*. Further, the year was divided into two halves, winter and summer, of six months each, and winter began with the month *wintirfyllið*. Here and here alone have we an account of a heathen Germanic lunisolar year. *A priori* such an account contains nothing surprising. Tacitus, *Germ.* XI, had already stated that the Germans observed the lunar month. The question is whether they also named the months and arrived at a fixed series, whereby the empirical intercalation of a month would arise of itself. In the last centuries of heathen times they were certainly not at a lower stage of civilisation than many other peoples in various parts of the world among whom this form of year did arise, but the trustworthiness of the report is far from being established by this general consideration.

Bilfinger has subjected the account to severe criticism, and on internal evidence states it to be a construction of Bede's [1]. The account, he says, fluctuates between the solar and the lunar year; for instance Bede says in one place that the year begins on December 25th, and in another that winter begins with the lunar month *wintirfyllið*. But this is done in any description of a lunisolar year that does not choose expressions with pedantic accuracy. Even in modern scientific handbooks we read e. g. that the Attic year began with the summer solstice, which is an abbreviated and incorrect expression for 'at the first new moon after the summer solstice'. The learned chronologist, Bede, has, according to Bilfinger, elaborated his system upon the following points of departure: the derivation of the word 'month' from 'moon', the phrase *annus thri-lidi*, which really means 'a year so favourable that three sea-voyages can be made in it', and the beginning of the year on Dec. 25th, which is assumed by Bilfinger to be the ecclesiastical beginning of the year on Christmas

[1] Bilfinger, *Unters.*, II, 125 ff.

Day, at that time used in England. The Anglo-Saxon names of months, he concludes, are accordingly nothing more than native terms for the Julian months, and therefore first became names of months on the introduction of the Roman calendar. The criticism is acute, but is not without its weak points. Bede knew quite well that the Latin *mensis* is connected with *μήν* and properly means lunar month, and had a very good knowledge of matters chronological; why then should he claim lunar months for the Anglo-Saxons if to his knowledge only solar months existed among them? In regard to the explanation of *thri-lidi* we require to know from documents that two sea-voyages were usually made in summer, and what was the goal of these voyages that there should be only two of them. Such evidence is not forthcoming. And further, as Prof. Ekwall informs me, Bilfinger's explanation is linguistically improbable. Such a formation would presuppose a word **lið,* 'journey', and no such word exists; on the other hand *þriliði,* 'with three *liða*', is perfectly regular [1]. Further 'the holy month', *halegmonað,* cannot be explained by Christian influence, since there is no great Christian festival in September: the origin must be sought in the heathen cult, but is obscure. It is not improbable that the festival of harvest was intended. However this carries the name back to pre-Christian times. *Wintirfyllið* means, according to Bede, '(first) full moon of the winter'. With this is connected Gothic *fulliþ,* translated by 'full moon' [2]. By this parallel the lunar character of this month is also proved. In opposition to Bilfinger's theory it therefore appears that there are a couple of facts, arising out of the months themselves, which point to the heathen origin and lunar character of the months.

The difficulties lie elsewhere. The beginning of the year is according to Bede Dec. 25. But where a fixed series of twelve months exists, with a fixed intercalary month, it lies

[1] *Lið,* 'ship', *liða,* 'seafarer' have short *i* and could not give *þriliði.*
[2] F. Kluge, *Nominale Stammbildungslehre,* 2nd ed., 1899, p. 66. The word is used in *Coloss.* II, 16, and translates Greek *νεομηνία*; this word really means 'new moon', but in later Greek any festival. Hence it is not very surprising that Ulfilas should have put 'full moon' for *νεομηνία.*

in the nature of things that the month which is doubled in the intercalation should be the beginning of the year, since this month is regulated by a fixed point or season of the year; the month in question is in this case *liða,* in summer. Now the beginning of the year in the sense mentioned above, p. 276, does not necessarily coincide with the beginning of the series of months. The beginning of the year in this case, however, is on Bede's own testimony the beginning of winter, as among the Scandinavians. We are therefore driven to the conclusion that Bede erroneously substituted the ecclesiastical beginning of the year at the Christmas festival, and that the cause of his error was the fact that at this time the heathen Anglo-Saxons celebrated a Feast of the Mothers, which corresponded to the Scandinavian Yule festival celebrated at the same time of the year; whereas in reality the Anglo-Saxons, like most peoples, had no sharply defined beginning of the year.

Although, therefore, Bede's account presents great difficulties, they are not diminished by the assumption that the scheme is a construction of his own. In my opinion there is no denying the trustworthiness of the account or the probability that the heathen Anglo-Saxons had arrived at a fixed series of months with empirical intercalation in the summer. But even if this was so, the case is isolated, and does not advance our knowledge of the form of the year among the other Germanic peoples. This only may be pointed out, that the Icelanders inserted their intercalary week in the summer just as the Anglo-Saxons, according to Bede, did with their intercalary month. But since the form of the year is so entirely different in each case, this agreement cannot be made to support further conclusions, any more than the two cases of agreement with the Gothic calendar.

The Icelandic months, in conformity with the peculiar arrangement of the year, do not coincide with the Julian, but begin either shortly before or in the middle of these. The series is: — 1, *Þorri;* 2, *Goi;* 3, *Einmánaðr,* because one month is left before the beginning of summer; 4, *Gaukmánaðr* (cuckoo month), or *Sáðtið* (seed-time) or *Harpa* (unexplained); 5, *Eggtið* or *Stekktið* or *Skerpla* (unexplained); 6, *Sólmánaðr* (sun month)

or *Selmánaðr* (cowherd's hut month); 7, *Miðsummar,* or *Heyannir* (hay-time); 8, *Tvímánaðr,* since two months are left to the beginning of winter, or *Kornskurðmánaðr* (barley-cutting month); 9, *Haustmánaðr;* 10, *Gormánaðr* (slaughtering month, *gor* is the refuse thrown away in the slaughtering); 11, *Frermánaðr.* (frost-month) or *Ylir* (cognate with *Yul*); 12, *Jólmánaðr* (Yule-month) or *Hrútmánaðr* (ram month, on account of the pairing of the sheep) or *Mörsugr* ('the fat-sucker') [1]. Some of these names are also used to describe seasons and have been explained above, p. 74. With the exception of *Þorri, Góa,* and *Einmánaðr,* however, these months are not used in practical life, where the reckoning is performed in weeks. In modern times the Icelandic months have other names but keep the same position in the year: — 1, *Miðsvetrarm.* (midwinter month); 2, *Föstu(in)gangsm.* (beginning of fasting); 3, *Jafndøgram.* (month of the equinox); 4, *Sumarm.* (beginning of summer); 5, *Farðagam.* (because it is the legal time for moving); 6, *Nottleysum.* (the nightless month); 7, *Stuttnœttism.* (month of the short nights) or *Maðkam.* (as in Denmark, month of worms); 8, *Heyannam.* (month of the hay-time); 9, *Addrattam. (m. necessitatum apportandarum);* 10, *Slatrunarm.* (slaughtering month), older *Garðlagsm. (m. sæpium struendarum);* 11, *Riðtíðarm.* (spawning month); 12, *Skamdegism.* (month of the short days) or *Jólam.* [2].

In Norway, according to Finn Magnusson [3], January is sometimes called *Thorre,* February sometimes *Thorre,* now and again also *Gjö,* March sometimes *Gjö,* here and there also *Krikla,* June *Gro* (sprouting month); I shall return below, p. 302, to the explanation of the variation. Weinhold gives a complete list: — 1, *Torre;* 2, *Gjö;* 3, *Krikla* or *Kvine;* 4 and 5, *Voarmoanar;* 6 and 7, *Sumarmoanar;* 8 and 9, *Haustmoanar;* 10 and 11, *Vinterstid;* 12, *Jolemoane* or *Skammtid* (time of the short days) [4].

Of the Danish months the learned Olaus Worm in the 17th century gives two series [5]. The months of the first series

[1] Bilfinger, *Unters.,* I, 7. [2] Worm, p. 48; Finn Magnusson in *Edda* III, 1044 ff., whence the translations are taken. [3] *Edda* III, 1044 ff. [4] Weinhold, *Mon.,* p. 23, without giving source. [5] Worm, pp. 43 ff.

are lunar months, he says, and begin with the first new moon of the new year: — 1, *Diur Rey* or *Renden*, on account of the pairing of the animals *(at løbe i Rhed)*; 2, *Thormaen*; 3, *Faremaen*, on account of the journeys; 4, *Maymaen*; 5, *Sommermaen*; 6, *Ormemaen* (month of worms); 7, *Hoemaen* (hay month); 8, *Kornmaen*; 9, *Fiskemaen*; 10, *Sædemaen* (seed month); 11, *Pølsemaen* (sausage month); 12, *Julemaen*. The intercalary month is called *Sildemaen*, 'the late month'. The Julian months are called: — 1, *Glugmanet*; 2, *Blidem.* (the mild month); 3, *Torm.*; 4, *Farem.*; 5, *Maym.*; 6, *Skærsommer*; 7, *Ormem.*; 8, *Høstm.*; 9, *Fiskem.*; 10, *Sædem.*; 11, *Slagtem.*; 12, *Christm.* The northern Danes and the inhabitants of Skåne are said to call the first four months: 1, *Glug*, 2, *Gøje*, 3, *Thor*, 4, *Blidel*. *Blidel* was until our own time in popular use in southern Skåne, but it denoted February and in this position it appears in Hickes [1]. The same series is found in Finn Magnusson [2], but with certain variants: — 1, *Ism.* (ice month); 2, *Dyrem.*; 4, *Faarem.* (sheep month); 6, *Sommerm.*; 7, *Madkem.*; 8, *Høm.*; 10, *Ridem.* (riding month); 11, *Vinterm.*; 12, *Julem.* [3]. Feilberg in his well-known Dictionary of the popular speech of Jylland gives some characteristic modern popular names. *Helmisse* ('holy mass') really means All Souls' Day, and then an old worn-out horse, whose last strength is exhausted in the autumn ploughing and who dies in consequence; hence September or October obtains the name *helmissemåned*. March is called *kattemåned*, from the pairing of the cats, or *prangermåned* (*pranger* = 'dealer'), because most business is transacted then. These are evidently more in the nature of by-names, but it is precisely names of this sort that oust the Latin names, since they are intelligible.

In the Swedish almanac, until it was modernised in the year 1901, Swedish names stood beside the Latin. They ran: — *Torsmånad, Göjem., Vårm.* (spring month), *Gräsm.* (grass month), *Blomsterm.* (month of flowers), *Sommarm.*, *Höm.* (hay month), *Skördem.* (harvest month), *Höstm.* (autumn month),

[1] Hickes, I, 215, written *Blindemanet*. [2] *Edda* III, 1044 ff. [3] Hickes, *loc. cit.*, has as variants 1, *Ism.*, 10, *Riidm.*, 11, *Winterm.*

Slaktm. (slaughtering month), *Vinterm.*, *Julm.* It is true that these names were never used. The series has arisen from an older one which is first attested for the year 1538. In the latter three months have Latin names, *Marsmånad, Aprilmånad, Majmånad,* October is named *Winmånad* (vine-month), December *Christmånad.* These names shew that the series is of German origin: in Sweden vines are not cultivated, and December 24th is never called Christmas 'Eve but Yule Eve. The list agrees with one given by Weinhold, p. 8, which as early as the 15th century was common to all Germany, and the agreement is shewn also in this point that, as is often the case in German lists, the months 3, 4, and 5 retain their Latin names. When it is further remembered that *Augst* means 'harvest', the variations will be seen to consist only in the substitution of the old names *Tor* and *Göje* for *Jenner* and *Hornung* and the renaming of 'the fallow month' *(Brachmonat)* from midsummer, which is in Sweden a great popular festival. The more suitable *Slakt-* and *Julmånad* were substituted for *Win-* and *Christmånad* in 1608 by the almanac-maker Forsius: the three Latin names were first exchanged for Swedish in 1734 by the almanac-maker Hiorter [1]. There is moreover one Swedish name which is still very popular and which falls outside the usual series, viz. *rötmånaden* ('the rotten month'), so named because it falls in the most sultry time of the summer, when it is very difficult to keep meat and other food from going bad. It is fixed at the time in which the sun stands in Leo (July 22 — Aug. 23; about July 13 — Aug. 14, old style). Formerly it was known as 'the Dog-days', — a translation of *dies caniculares* — and the position varied considerably. The period descends from the period of the Etesian in the ancient Greek calendar, and it was not till the 17th century that it was generally equated to the time during which the sun stands in Leo [2].

The Swedish list of months is therefore largely of foreign or learned origin. The only popular names are *Tor* and *Göje,*

[1] The history of the Swedish list of months is dealt with in detail by the present writer in the essay *De svenska månadsnamnen, Stud. Tegn.*, pp. 173 ff., to which the reader is referred for the documents. [2] *Ibid.*, pp. 177 ff.

which also often occur without the addition of 'month'. The Icelanders have made Þorri and Goi into mythological figures [1]. In Sweden the people have personified these names. When it snows, Goja shakes her robe. Thor (= March), with the long beard, entices the children outside the wall, they say in the north of Skåne, — in the south the same thing is said of *Bliel* (*Blidel* = February) — and then *Far Fäjeskinn* (= April) comes and drives them in again. The latter month is conceived of as 'Father Sweep-skin': but it is possible that in *far* the month-name *Fare-maaned* (= April) appears. In Norway the names of the same three months — *Thorre*, *Gjö*, and *Krikla* — were the only ones in common use, and so in Iceland, *Þorri*, *Goi*, and *Einmánaðr*. The beginning of these three months was hailed with popular celebrations both in Iceland and elsewhere in Scandinavia [2]. And now attempts have been made to prove that these Norwegian months are old lunar months. In Aasen's Norwegian Dictionary it is stated that the country people even to-day still count and name the moons, so that e. g. the moon which is in the heavens during the Yuletide-festival is termed the Yule moon if it continues until the end of the festival, the day of Epiphany: and if it does not last till the end of this period, then the next following moon is the Yule moon, i. e. the Yule moon is in reality the moon which is in the heavens on the day of Epiphany. The terms and the calculation of the following moons are regulated accordingly. Certainly the heathen Germans must have been acquainted with the lunar month, and the existence of the lunisolar calendar among the Anglo-Saxons is not to be denied, but in this case we must unreservedly agree with Bilfinger [3] that this lunar reckoning is of Christian origin. Then in order to fix the date of the important movable festivals the most convenient practical means was to begin from the first new moon after the day of Epiphany, i. e. after the Yule moon. The old rule says: — "Count the moon which is in the sky on the day of Epiphany as long as it lasts, and then ten days onward from the new

[1] Bilfinger, *Unters.*, I, 32. [2] Weinhold, *Mon.*, pp. 38 and 58; Axel Olrik, *Zeitschr. des Vereins f. Volkskunde, 20*, 1910, p. 57. [3] *Unters.*, I, 49, ff.

moon, and you have the *terminus Septuagesimæ*." Hence is derived the Swedish peasant rule: — "The moon which is in the sky at the day of Epiphany shall be the Christmas moon, whether it be young or old." After this follows the *disting*-moon [1]. On account of the ecclesiastically prescribed period of Lent and the Easter festival it was absolutely necessary to be able to calculate this time, and the calculation was most simply performed in the fashion just described, although the phenomena of the heavens did not exactly agree with the rule of computation. The third of these moons was followed by the Easter festival. For this reason these three months have stamped themselves upon the minds of the people in all the Scandinavian countries. It is because they are lunar months, and not because they began, like the Icelandic months, in the middle of the Julian months, that the relationship of the first three Norwegian names of months to the Julian varies in the manner shewn above, p. 298. A further question, however, is the age of the names *þorri* (*Tor*) and *Göje*. Since in spite of many ingenious attempts these words remain etymologically unexplained, and moreover are not borrowed, the names must originate in an older period. What they meant before they received their present application we do not know, but there is nothing to shew that they are not old names of months. There is a possibility, certainly somewhat remote, that their use as names of months is pre-Christian, although the computation is Christian. There would be nothing surprising in this, if it were the case, since the Germans were acquainted with lunar months, and they had attained a much higher stage of civilisation than many peoples who were familiar with the lunisolar year as regulated by empirical intercalation.

A sure indication of an Old Swedish heathen reckoning in lunar months has been acutely pointed out by Beckman [2] in the rule, attested from the time of the Reformation, for fixing the date of the fair at Uppsala known as the *disting*, which is a direct continuation of the great sacrificial festival at the heathen temple in Uppsala, the *disablot*. The rule, as has

[1] Celsius, pp. 211, 65. [2] Beckman, *Stud. Tegn.*, pp. 200 ff.

already been indicated (p. 302), says that the *disting* shall be held at the full of the moon following the Epiphany moon, and therefore exactly two months before the Easter full moon. This rule certainly goes back to ancient times and cannot arise from the Christian computation of Easter, since there would be no reason for arranging with reference to Easter the date of a fair so long before Easter and originating in heathen times [1]. Rather is the explanation given in the words of Tacitus, that the Germans held their assemblies at new or full moon, which would also apply to the great sacrificial festival and the popular assembly of the Svear. This however presupposes that the insertion of the intercalary month was fixed in some way, so that no error might arise in regard to the moon of the *disting*. After Christianity was introduced, and with it the computation of the three moons before Easter, the computation of the *disting*-moon was also modified in accordance with these. A statement of Snorre [2] however causes difficulty. Snorre says that the *disablot* was celebrated in *Goe,* but that after the introduction of Christianity the date of the fair was altered to Candlemas (Feb. 2). The latter statement contradicts the rule, and is ingeniously explained by Beckman. In the year 1219, when Snorre was staying in Sweden, the full moon of the *disting* fell on the first of February, and Snorre has generalised the single case. *Goe,* as has been seen above, is the name of the month, but the Göje new moon has been shewn to be the second after Epiphany, and therefore

[1] Beckman, *loc. cit.,* tries to prove the heathen origin of the computation of the *disting* and its independence of the Easter reckoning by the statement that the former follows the phenomena of the heavens, the latter the rule of computation, which may lead to a different result. Unfortunately this conclusion cannot be considered too binding, since for the people in general, who knew nothing about this rule, — how late in medieval times the runestaves appeared we do not know, but certainly not at the beginning of the Middle Ages — it was still absolutely necessary to determine in some degree the time of fasting and the Easter time. And if the absolutely correct calculation could not be made, it was still better than nothing to have one that was at least approximate and easy to make. The fact that the moon of disting was calculated from the phenomena of the heavens is expressly stated in the rule as given above, p. 301. [2] Saga of Saint Olaf, ch. 76.

the moon following the *disting*-moon, which is identical with the *Tor* new moon. Herein lies an unexplained difficulty. It is to be presumed, however, that the arrangement of the heathen lunar months must have been different from that of the Christian Easter moons, and that this must have been the cause of the difference in the position of the moons. The heathen *disting*-moon, called *Goe,* did not entirely correspond either to the Christian *þorre* or to *Goe:* Snorre has made *Goe* equivalent to it, otherwise it has been made equivalent to *þorre.* The necessity of computing the Christian Easter has very often caused the new moons to fall after the period (Yule, Tor, Goe) from which they are named. On the contrary the *disting*-moon is the very moon in which the *disting* is held. This is certainly a survival of an older pre-Christian computation, which was later fitted into the Christian computation of the new moons before Easter, and was re-arranged accordingly.

In the other Scandinavian countries also the enumeration of the moons between Christmas and Easter was neglected after the Reformation had made the observation of the fast superfluous, or rather it was replaced by another: the New Year's Day appears as the regulating point instead of Epiphany.

The Swedish almanacs of the 16th and 17th centuries give the new moons in words, the practice ceasing in the second half of the 17th century. In accordance with the custom of the ecclesiastical computation the new moon is (nearly always) named after the following month, that in which the moon ceases: *Ny Göijemånat,* the new moon of Göje, therefore falls in *Torsmånad* (January), and so on. Sometimes, doubtless inadvertently, the new moon is named after the month in which it falls, i. e. *Ny Göijemånat* falls in February. Now certain years receive 13 new moons, and therefore one intercalary moon, for which the computers give rules. But the almanac-makers never follow these rules. In two or three of the oldest almanacs [1] the intercalary moon is certainly described as such [2], but its position in the year does not correspond to the rule of the computers: in 1603 it is simply placed in the Julian month in which two

[1] Olaus Andreae and Gerardus Erici, 1600; Petrus Gisæus, 1603. [2] *Ny inkombling* = 'new-comer', 'intruder'.

new moons fall. Otherwise the difficulty is got over by leaving uncounted the intercalary moon or some of the new moons. Another way out is chosen by Herlicius, 1630 and 1641, and Thuronius of Åbo, 1660: *Torsmånadsny,* the new moon of January, is contrary to the rule placed in January; in the further enumeration the new moons run over into the month preceding that after which they are named, and the thirteenth and last new moon is again called *Torsmånadsny,* i. e. this is doubled and serves as an intercalary moon. Here, therefore, the insertion of the intercalary moon depends upon the position of the new moon in relation to the beginning of the year, i. e. to the first of January.

This method has become popular, and its popularity has been assisted by the fact that the people, through the use of the rune-staves recording the golden numbers, were accustomed to the calculation of the new moon. Above all the first moon of the year (*nykung* = 'new king') played a very important part. The men took off their hats and the women curtseyed when they saw it; from it were taken oracles for the new year. The question is whether a popular name was also given to the new moons. Apart from the almanacs, which use the names of months introduced into them, I find in Swedish only one example: *Torretungel* (*tungel,* dialect for 'new moon') [1]. The Danish chronologist Worm gives both a lunar and a solar series of names of months [2]. The names are for the most part equivalent or similar to those of the solar series, but in the first half of the year they occupy an earlier position, which fact certainly has something to do with the naming of the new moons according to the usual computation. Worm expressly states that these lunar months were still in use and began with the first new moon of the new year.

An account of connected lunar months among the East Finns has been translated and communicated to me by Professor Wiklund. The authority makes a man of the people speak as follows [3]: — "The moon which is born while the winter day is still in his house (December 18—22), or after

[1] Celsius, p. 111. [2] See above, p. 299. [3] J. Häyhä, III, 101 ff.

that, is the first heart- (middle-) moon. In this way the Christmas festival sometimes falls in the first heart-moon, and then we hope for a good harvest. But when the first heart-moon is born late, e. g. after Twelfth Day, there is no second heart-moon in this year, but there follow the foam-moon (so called because the snow looks like foam), the snow-crust moon, the melting moon, the sprouting moon, etc..... When we reckon the moons of the year, beginning with the first heart-moon, we sometimes get thirteen months in the year, although there are only twelve book-months." At first sight it is very tempting to see in this account old Finnish moon-months regulated by the winter solstice, as e. g. among the Siberian peoples, which would be quite conceivable so far north. However this is not so. The heart-moon is in the given instance doubled, i. e. it is an intercalary moon. Now it is a familiar fact that the intercalary month, i. e. the first of the two months with the same name, gets in front of the regulating-point; it is therefore 'forgotten', and a second moon with the same name is inserted after it. We must therefore ask: — Within what limits, under the given conditions, will the moon fall which in ordinary years is the heart-moon, in leap-year the second heart-moon? The following tables give the answer: the limits begin at the two extremes of new moon on the first and on the twenty-ninth of January; we must of course reckon one day for the solstice, December 21, and not the whole 'house'.

		Beginning of the first heart-moon.	Beginning of the second heart-moon.
I. From Jan. 1.	12 moons	to Dec. 22,	13 moons to Jan. 20.
	12 »	» Jan. 9.	
	12 »	» Dec. 29,	13 » » Jan. 28.
	12 »	» Jan. 17.	
	12 »	» Jan. 5.	
	12 »	» Dec. 26,	13 » » Jan. 24.
	12 »	» Jan. 14.	
	12 »	» Jan. 3.	
	12 »	» Dec. 23,	13 » » Jan. 22, etc.

II. From Jan. 29. 12 moons to Jan. 18.
12 » » Jan. 7.
12 » » Dec. 27, 13 moons to Jan. 25.
12 » » Jan. 14.
12 » » Jan. 3, etc.

The regulating-point is therefore New Year's Day: the heart-moon, and in leap-year the second heart-moon, begin with the first new moon after this. This rule however makes it impossible for the first heart-moon ever to begin before the winter solstice. It will be found that in regard to the position of the heart-month, and in leap-years of the first heart-month, this regulation leads to such a position of these months as is given in the account. The calendar is therefore not a native lunar one, but the already mentioned adaptation of the lunar reckoning in accordance with the new year of the Julian calendar [1]. The Finns, who from the earliest times have owed their culture to the Scandinavians, have taken this process from them also, but in Finland it has not been driven out by the influences of later civilisation, just as in Norway, which long remained comparatively untouched by these influences, the Catholic lunar reckoning has been preserved.

The above-quoted source unfortunately does not preserve all the names of months. A similar but somewhat different complete list has been drawn up by Lönnrot in Karelia: — 1, heart-month; 2, heart-month; 3, foam-month; 4, tree-felling month; 5, melting or sowing month; 6, summer month; 7, hay month; 8, pus month (cf. the Swedish 'rotten month', above, p. 300); 9, harvest month; 10, autumn month; 11, dung or dirt month; 12, month of clods; 13, Christmas month [2]. Here too the heart-month appears doubled.

The Lapps also have taken their reckoning from the Scandinavians: of the reckoning in weeks we have spoken above. In Old Scandinavian times they borrowed the word *mānō*, Lapp *maŋŋo* (moon). The Lapp word means both 'moon' and

[1] There can here be no question of the Catholic regulation of the moons by the Epiphany Day, since if this were assumed the first heart-moon could not begin earlier than Dec. 27, and would therefore not come within the winter solstice, as the account says it must. [2] Schiefner, p. 217.

'month'; only among the southern Lapps is there found a native word *aske,* 'moon', which one dictionary also uses as a term for 'month'. Therefore at the time when the Lapps adopted the word *manno* for 'moon' and 'month', the month of the Scandinavians must have been a lunar month, and so also among the Lapps. In some authors the form *mannod* occurs, i. e. modern Swedish *månad*, 'month'. The Lapp names of months were not collected until last century. They appear sometimes with, sometimes without, the addition 'month'. They are: — 1, new month, new year (month), new day (month), New Year's Day month; 2, Göjem. (*knowa,* a loan-word therefore), rarely *'swan month'; 3, *'swan month', because the swan comes in March, rarely *marasm.* (*mars*, loan-word), rarely *'crow month'; 4, *'crow month', on account of the coming of these birds, rarely *'snow-crust month'; 5, '(hard) *snow-crust month', since the surface of the snow, which melts in the daytime in the bright sunshine, freezes at night into a hard crust, *'month of calves', 'calf month', when the reindeer bring forth their calves; 6, *'month of calves', *'fir month', since the sap rises in the firs, 'flesh month', '(mid)summer month'; 7, rarely *'fir month', *'month when the reindeer has shed its hair'; 8, called *the same, also *'month when the hair has grown thick again'; 9, has *the same name as 8, or *'rutting month' (the rutting-time covers the end of September and the beginning of October), or *'month when the male reindeer are powerless' (after the rutting); 10, has *the same name as 9, or else *'rutting month', or 'autumn month'; 11, is also generally called *'month when the male reindeer are powerless', rarely *'Advent month'; 12, *'Advent month *(passatis(m.), p.* means the first Advent Sunday and the first week in Advent), 'Yule month' [1]. Qvigstad [2] calls the twelfth week-month of the Lapps *båse-tæbme manno,* 'the month without a feast', the thirteenth *basse m.* or *juowla m.*

The Lapps were also acquainted with the 'rotten month' *(mieska manno,* Swedish *rötmånad)* [3]. A Lapp woman mentioned by Wiklund gave this month the position of the ninth

[1] Wiklund, pp. 5 ff. [2] *Act. soc. scient. fennicae, 12,* 1883, p. 166. [3] See above, p. 300.

in the series, and explained it as the month in which the grass begins to fade and rot. On the strength of this Wiklund assumes a thirteen-month year, but the statement is inconclusive, the 'rotten month' having certainly been placed erroneously as a separate month in the series. That this is so is supported not only by Qvigstad but also by Högström in his description of Lapland of the year 1746, in which he speaks of thirteen week-months of the Lapps. According to this authority the Lapps drew their rune-calendar on seven discs of reindeer-horn, but only one side of the seventh was written on, so that there were 13 sides of four weeks each, which they called a month, and so their reckoning was 13 months, he says. Wiklund has accepted this four-week month. It is quite possible that the Lapps called a period of four weeks a month: we also often do the same when an approximation will serve; but that the names of months mean periods of four weeks seems very questionable. It would be a quite isolated case: everywhere else the months are either the Julian or lunar months, with which last the Lapps were acquainted, at least in ancient times. The statement that on the basis of the reckoning by weeks a four-week month could have arisen is certainly not absolutely to be denied, — if this is so, it must be a secondary and late development — but the fluctuation of the names of months is no evidence for this. It is only the fluctuation found everywhere when names of seasons are transformed into names of months. Only the names of the first two months are quite fixed, and these are either essentially or literally loan-words: the Latin name even appears in one instance for March. There is consequently borrowing in the case of the three names which alone, as also among the Scandinavians, have become really popular. If the Lapps really had thirteen months, it might then be supposed that these, as in Denmark and Finland, were lunar months which began at the first new moon of the new year. But we find no trace of lunar months in Lapland in historical times. We must therefore content ourselves with the fact that the Lapp names of months shew the same fluctuation as is shewn by all names taken from natural objects or phenomena and applied to the months.

This brief survey of the popular months of the European peoples is instructive from the point of view of a comparison with the names of months among primitive peoples. Although the Julian months have a fixed position in the solar year, and do not fluctuate to and fro like the lunar months, yet the names of the months are unstable and fluctuating. This is due to the fact that in the desire for concrete observations the names of the seasons and of their occupations have been kept, and the seasons have neither fixed position nor duration: these names of months derived from natural phenomena and occupations have not therefore in themselves the precision which the chronological system demands. Such precision will only be introduced by an external factor, in the one case by the lunar months, in the other by the Julian months to which the names of the seasons are transferred.

CHAPTER XII.

SOLSTICES AND EQUINOXES. AIDS TO THE DETERMINATION OF TIME.

We have seen in the foregoing pages how the phases of Nature, with their somewhat variable dates, are everywhere employed in the determination of time; how in the moon there lies ready to hand a clear, stable (at least within very narrow limits), and constant unit of time which could be turned to account in calculating; and how out of the fusion of natural phases and moons there arose a roughly empirical lunisolar year. For the more accurate fixing both of the seasons and of the months the phases of the stars are employed; these, being dependent on the sun, keep pace with the natural year, but, unlike the phases of Nature, are not subject to climatic variations but are astronomically fixed.

It is however possible astronomically to fix the solar year by a second method, viz. the observation of the annual course of the sun, especially of the solstices: the observation of the equinoxes is a much more difficult matter. The observation of the solstices can be performed in a way similar to that mentioned above, p. 21, in which noon is determined by the position of the sun, but is much more difficult to carry out and requires far more accurate and delicate methods. Two fixed points at least are necessary — a standing-ground and in the simplest case a mark on the horizon; other methods are still more complicated. An observation of the annual course of the sun, therefore, unlike that of the stars, — which everywhere, no matter where, can be performed immediately — demands a fixed place and special aids to determination. It follows that the observation of the solstices and equinoxes belongs to a much higher stage

of civilisation than does that of the stars. It can only arise among a people with a fixed dwelling-place, since a race which leads a nomadic life and changes dwellings and camps is without the necessary fixed points of observation. After all it is only natural — and this actually is the case — that the observation of the course of the sun should be in use only among certain specially gifted peoples.

It is used by the Eskimos, who have a very highly developed sense of place, and know how to make good maps. Moreover where the sun in winter stands very low on the horizon, and for a time altogether disappears beneath it, the conditions are very favourable for the observation of its return. Older authors say that by the rays of the sun on the rocks the Eskimos can tell with tolerable accuracy when it is the shortest day [1]; more recently we have been told of the Ammasalik that they can calculate beforehand the time of the shortest day — and that accurately to the day — not only from the solstitial point, but also from the position of Altair in the morning twilight [2]. They begin their spring when the sun rises at the same spot as Altair [3]. This is a quite isolated, but an accurate, determination of the course of the sun from the fixed stars. The Hudson Bay Eskimos of Labrador recognise the arrival of the solstices by the bearing of the sun with reference to certain fixed landmarks [4]. The Central Eskimos must do the same, since they are acquainted with the winter solstice and when this and new moon coincide they omit their intercalary month [5].

The tribes of Arizona observed the course of the sun, more particularly to determine the dates of their religious ceremonies, but also to decide the time of secular occupations. Among the Zuñi the winter solstice begins when the rising sun strikes a certain point at the south-west end of 'Corn Mountain', and a great feast is then celebrated. Then the sun moves to the north, passes the moon at *ayonawa yälläne,* and continues round to a point north-west of Zuñi, which is called 'Great Mountain', where it sets consecutively for four days at

[1] Cranz, I, 293; Dalsager, p. 54. [2] Holm, *10,* p. 141; *39,* p. 105. [3] *Ibid.,* 142, 104. [4] Turner, p. 202. [5] Above, p. 246.

the same point. The last day is the summer solstice. On this occasion also a great festival is celebrated [1]. The Hopi determine the time for their religious ceremonies, for planting, and for sowing by observing the points on the horizon where the sun rises or sets. The winter ceremonies are determined by the position of the sunset, the summer by the position of the sunrise. The two points of the solstices are called the "houses" of the sun. There are 13 landmarks, by means of which the seasons are determined from the ecliptic. The number suggests that there is some connexion with the months. It would in that case be a quite isolated example of the regulation of the months by the observation of the sun's position [2].

The Incas erected artificial marks. There were in Cuzco sixteen towers, eight to the west and eight to the east, arranged in groups of four. The two middle ones were smaller than the others, and the distance between the towers was eight, ten, or twenty feet. The space between the little towers through which the sun passed at sunrise and sunset was the point of the solstices. In order to verify this the Inca chose a favourable spot from which he observed carefully whether the sun rose and set between the little towers to east and west. For the observation of the equinoxes richly ornamented pillars were set up in the open space before the temple of the sun. When the time approached, the shadow of the pillars was carefully observed. The open space was circular and a line was drawn through its centre from east to west. Long experience had taught them where to look for the equinoctial point, and by the distance of the shadow from this point they judged of the approach of the equinox. When from sunrise to sunset the shadow was to be seen on both sides of the pillar and not at all to the south of it, they took that day as the day of the equinox. This last account is for Quito, which lies just under the equator. At the spring equinox the maize was reaped and a feast was celebrated, at the autumn equinox the people celebrated one of their four principal feasts [3]. The months were calculated from the winter solstice.

[1] Stevenson, pp. 108 ff., cf. 148 ff. [2] Fewkes, pp. 256 ff. [3] Garcilasso de la Vega, I, 199 ff.

Among the Amazulu, we are told, the path of the sun in winter is different from its summer path: for it travels northward till it reaches a certain place, — a mountain or a forest (where it rises and sets) — and it does not pass beyond these two places; it comes out of its winter house; when it comes out it goes southward to its summer place. We say that when it quits its winter place it is fetching the summer, until it reaches a certain mountain or tree; and then it turns northward again, fetching the winter, in constant succession. These are its houses; we say so, for it stays in its winter house a few days: and when it quits that place we know that it has ended the winter and is now fetching the summer; and indeed it travels southward until, when the summer has grown, it enters the summer house a few days, and then quits it again, in constant succession [1]. The Basuto also call the summer solstice the house of the sun, and intelligent chiefs adjust the reckoning of the months by it [2].

For the Bismarck Archipelago the following details are given. On the island of Vuatam there is celebrated some time after the solstice and usually at the beginning of January — the exact date depends on the weather — a festival the object of which is to regulate the course of the sun and to secure good weather. In the whole of the north-eastern part of the Gazelle Peninsula the fact of the solstice is known, although no festival is celebrated. When the sun had its greatest southern amplitude it rose over Birar on St. George's Channel. A native magistrate, To Kakao, explained how the sun would turn again and would finally attain its greatest northern amplitude on the horizon when it sank between the volcanic mountains 'South Daughter' and 'Mother'. In Valaur the view is completely cut off to the east, and so the sun is observed at its setting, the turning-point in the south being formed by two mountain peaks situated close together. Another southern turning-point is furnished by still another mountain. The spot denoting the turning-point in the Baining mountain is chosen rather far off, and the observation is therefore not very accurate. The solstices are brought into connexion with the variation of

[1] Callaway, p. 395. [2] Casalis, quoted by Frazer, p. 117.

the monsoons. To Kakao said that the north-east trade-wind blew all the time the sun was in the south (November to February), but during the time when it was situated in a northerly direction (May to August) the south-east monsoon prevailed. In Valaur the south-east monsoon blows as long as the sun sets WNW (May to August): but from November to February, when the sun sets WSW, the north-west trade blows [1]. The Moanu of the Admiralty Islands name the divisions of the year according to the position of the sun. If it stands north of the equator the division in question is called *morai im paiin* ('war sun'), since it is during this time more particularly that wars are carried on. When the sun stands above the equator this division is named *morai in kauas* ('sun of friendship'): this is the time of peace and of mutual visits. When the sun turns southward the colder season, *morai unonou,* begins [2].

One would suspect that this Melanesian science, like the knowledge of the stars, is borrowed from the Polynesians: for the latter understood the annual course of the sun. In Tahiti the place of the sunrise was called *tataheita,* that of the sunset *topa-t-era.* The annual movement of the sun from the south towards the north was recognised, and so was the fact that all these points of the daily approach to the zenith lay in a line. This meridian was called *t'era-hwattea,* the northern point of it *tu-errau,* and the opposite point above the horizon, or the south, *toa* [3]. According to other sources the December solstice was called *rua-maoro* or *rua-roa,* the June solstice *rua-poto.* The Hawaiians called the northern limit of the sun in the ecliptic 'the black, shining road of Kane', and the southern limit 'the black, shining road of Kanaloa'. The equator was named 'the bright road of the spider' or 'the road to the navel of Wakea', equivalent to 'the centre of the world' [4]. How the Polynesians came to recognise the tropics and the equator is unfortunately unknown, but certainly they did it like other peoples, by observing the solstices and equinoxes at certain landmarks.

That the Greeks also recognised the solstices by means

[1] Meier, pp. 706 ff. [2] Parkinson, p. 378. [3] Forster, p. 436. [4] Fornander, p. 127.

of the observation of certain landmarks may be gathered from a passage in Homer. In the Odyssey Eumaeus says of his native land: "A certain island Syrie . . . . . above Ortygia, where the sun turns" [1]. Wherever Syrie lay, even though in the realm of fable, the idea is that it lies in the direction of the spot at which the sun at its turning rises or sets. It therefore serves as a landmark, it is 'the house of the sun'. Hesiod is so familiar with the winter and summer solstices that he reckons time from them in days [2].

A much discussed question is whether the ancient Germans were acquainted with the solstices and equinoxes, an assumption which must be adopted by anyone who regards the Yule festival as a solstitial festival. Their acquaintance with these points has been denied and with this view I myself have concurred [3]. After my researches in primitive time-reckoning, however, I can no longer maintain this opinion for the later heathen times of the north. For it has been shewn that primitive peoples — and especially those living far north, e. g. the Eskimos — observed the solstices well from certain points on the horizon. Now it has already been seen that the northern peoples observed the times of day in the same manner [4], and this observation was also extended to the annual course of the sun. It is said, for example, that autumn lasts from the equinox until the sun sets in *eyktarstað*, i. e. the position in which it stands in the *eykt* [5]; and that south of Iceland and Greenland the sun at the time of the shortest days inhabits *eyktarstað* and *dagmálastað* (that is to say at 9 a. m.) [6]. The evidence, it is true, comes down from Christian days: but the method of determining time is of native origin and certainly goes back into heathen times. Hence it should not be denied that, although nothing of the kind has transpired, the solstices and equinoxes might have been approximately determined in the same way, and it may be that the regulation of the calendar profited by this.

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[1] *νῆσός τις Συρίη . . . . . Ὀρτυγίης καθύπερθεν, ὅθι τροπαὶ ἠελίοιο* — Od. XV, 403. [2] Hesiod, *Op.*, 564 and 663 respectively. [3] Cf. my *Årets folkliga fester*, p. 157. [4] Above, pp. 21 f.; so also Ginzel, III, 57. [5] Snorre's Edda, I, 150; cf. above, p. 21. [6] *Flateyjarbók*, I, 539.

Any other day of the year can be fixed by observation in the same way, though the observation of the solstices is probably the oldest. As late as the beginning of the 19th century this method was adopted in Norway as a check to the prime-staff. On certain farms there was a definite stone, buried in the earth, to which the people repaired for these observations. They noticed when the sun rose and shone out above certain mountain peaks, or when its last rays touched this or that summit. They also observed the length of the shadow on the face of a cliff, or noted when it touched the brow of a mountain or a certain stone. Thence they were able to give the important days of the year, e. g. the festival of St. Paul or Candlemas. Our authority says that the observation was very inaccurate, so that the Christmas Day of the people might fall on January 2. But it was not so bad as that, since they still followed the old style. The sun-mark for the first summer day (April 14) agreed with the 23rd of April [1].

Agricultural peoples in particular have developed various methods of this kind. The rice-cultivating peoples of the East Indies use various methods in order to determine the important time of sowing. Of the observation of the stars we have already spoken [2]. Among the Kayan of Sarawak an old priest determines the official time of sowing from the position of the sun by erecting at the side of the house two oblong stones, one larger and one smaller, and then observing the moment when the sun, in the lengthening of the line of connexion between these two stones, sets behind the opposite hill. The sowing-day is the only one determined by astronomical methods. In other respects the time-reckoning is a more or less arbitrary one and is dependent on the agriculture [3]. Of the hollows in a block of stone at Batu Sala, in the river-bed of the upper Mahakam, it is said that they originated in the fact that the priestesses of the neighbouring tribes used formerly to sit on the stone every year in order to observe when the sun would set behind a certain peak of the opposite mountain. This date then decided the time for the beginning of the sowing [4].

[1] Riste, pp. 6 and 8. [2] Above, pp. 137 ff. [3] Nieuwenhuis, I, 317. [4] *Ibid.*, I, 160.

In the first example we have artificially erected marks instead of the usual natural landmarks: compare also the towers at Cuzco. The pillars of Quito were a kind of gnomon, an instrument of immense importance for the scientific astronomy and accurate time-determination of antiquity. In this case the observation was much simplified on account of the situation just below the equator. The method is used again in Borneo, where it is very important to determine the right time for sowing the seed, and the approach of the short dry season before it in which the timber from the clearings must be dried and burnt. The Kenyah observe the position of the sun. Their instrument is a straight cylindrical pole of hardwood, fixed vertically in the ground and carefully adjusted with the aid of plumb-lines; the possibility of its sinking deeper into the earth is prevented. The pole is a little longer than the outstretched arms of its maker and stands on a cleared space by the house, surrounded by a strong fence. The observer has further a flat stick on which lengths measured from his body are marked off by notches. The other side has a larger number of notches, of which one marks the greatest length of the midday shadow, the next one its length three days after it has begun to shorten, and so on. The shadow is measured every midday. As it grows shorter after reaching its maximal length the man observes it with special care, and announces to the village that the time for preparing the land is near at hand [1]. In Bali and Java the seasons are determined by the aid of a gnomon of rude construction, having a dial divided into twelve parts [2].

The Kayan use a somewhat different method. The weather-prophet lets in a beam of light through a hole in the roof of his chamber in the long-house, and measures the distance of the patch of light from the point vertically below the hole. Thus they obtain a measurement similar to that given by the

[1] Hose and McDougall, I, 106 ff.; unfortunately I have not had access to the work of Hose quoted by Frazer on p. 314, n. 3, *Various Modes of computing the Time for Planting among the Races of Borneo,* Journal of the Straits Branch of the Royal Asiatic Society, no. 42, Singapore, 1905.
[2] Crawfurd, I, 300 ff.

shadow on a sun-dial [1]. Still more elaborate is the method used by some of the Klementan by which time is determined from the position of a star. A tall bamboo vessel is filled with water and then inclined until it points directly towards a certain star. It is set upright again, and the level of the water left in the vessel is measured. In order to determine the seed-time the vessel is provided with an empirically given mark at a certain height, and when the level of the water coincides with the mark after the inclining of the vessel towards the star, it is the time for sowing [2]. The writers omit to say that the observation must take place at a certain time of day, e. g. morning or evening twilight. Then it becomes possible to determine the season by the height of the star above the horizon.

All this is neither primitive nor native. In Bali and Java the Brahmin and Islamite priests observed the sun-dial, and from there the practice came to Borneo. Where the idea of using a vessel of water for measurement originated I am unable to determine, but it is much too refined to be a primitive invention. The only genuinely primitive method is the observation of the annual course of the sun and the solstices by the aid of certain landmarks on the horizon. This method is found in all parts of the world, but only among certain peoples. It has never attained real importance for the regulation of the calendar: the development of the calendar to greater accuracy proceeds by the indirect way of the lunisolar time-reckoning.

By way of appendix a few notices of the aids used in calculating may be collected. They are almost always quite simple — knots in a string, the tally, or the joints of the body.

The use of the tally in counting the years has already been dealt with above [3]; this use is certainly later, each stick attaining so to speak an individual life. It is otherwise with the counting of the days, where the question usually is to determine the number of days which will elapse before an assembly or some other undertaking previously agreed upon, so that all may arrive together. The same reckoning may also occasionally serve a second purpose.

[1] Hose and McDougall, p. 108. [2] *Ibid.*, I, 109; II, 139. [3] p. 104.

The Peruvian *quipos* mark the culminating-point of the method of counting by knots in a cord. Something similar existed among the Nahyssan of Carolina. Time was measured and a rude chronology was arranged by means of knots of various colours. This system proved so convenient in dealing with the Indians that it was adopted for that purpose by a governor of South Carolina [1]. When a chief of the Miwok of California decides to hold a dance in his village, he dispatches messengers to the neighbouring rancherias, each bearing a string wherein is tied a number of knots. Every morning thereafter the invited chief unties one of the knots, and when the last one is reached, they joyfully set forth for the dance — men, women, and children [2]. Sticks serve the same purpose. Once when the Natchez and the Chocktaw wished to attack the French in Louisiana, each tribe received a bundle of sticks, one of which was to be withdrawn and destroyed each day, so that they might strike their blows at the same time [3]. The Pawnee used the tally for counting nights, months, and years, but had advanced so far as to employ picture-writing in doing so. * means day or sun, × star or night, ☾ moon, month [4]. This is the forerunner of the Indian picture-calendar already mentioned [5].

According to Barrow the Caffres assist their memories by means of a tally, although this authority did not himself find this custom among them; but the Hottentot servants of the colonists, among whom were several Caffres, used this method in counting the number of the cattle earned [6]. Among the Wagogo if it was desired to count the days, e. g. in connexion with the sitting of a court of justice, as many knots were tied in a string as there were nights to elapse before this date. In Nigeria palm-nuts are used in counting [7], just as in southern Brazil the years are counted by means of acajou nuts [8], and as the tribes of Bolivia count with grains of maize [9]. The Baganda, in order to keep in mind the days of the month, tie knots in a piece of plant-fibre and afterwards count the

[1] Mooney, *Siouan Tribes*, p. 32. [2] Powers, p. 352. [3] Du Pratz, III, 237 ff. [4] Dunbar, p. 1. [5] Above, p. 104. [6] Alberti, p. 68. [7] Claus, p. 38. [8] Above, p. 93. [9] Chervin, p. 229.

knots [1]. In New Guinea the months were counted by means of notches cut in trees: the New Zealanders are said to have added every month a little piece of wood or a small stone to a heap [2].

In the Nicobars notched sticks in the form of a scimitar-blade are in use. They have notches on the edge and on the flat, the former denote months, the latter the days of the waning and waxing moon. They are used e. g. in finding out when a child of the owner learned to walk. The Shompen take a piece of bamboo and make as many bends in it as they mean to reckon days [3]. The Negritos of Zambales in order to count the days make knots in a cord of *bejuco* and cut off one of these knots every day [4]. On the Solomon Islands also knotted cords are used for the same purpose [5]. The counting is particularly necessary for the celebrating of the great feast of the dead at the proper time. The eating the death, *gana matea,* begins with the burial; they eat first, as they say, 'his graves', after that they eat 'his days' — the 5th, 10th, and after that every ten up to the hundredth, and it may be, in the case of a father, wife, or mother, even so far as the thousandth. For counting the days, so that the guests from distant villages may arrive on the proper days, they use cycas fronds, one in the hands of each party, on which the appointed days are marked by the pinching off or turning down of a leaflet as each day passes [6]. According to another authority the moons are counted. At the coming of the young moon after the death of a man either a knot is made in a thread or a notch is cut in a piece of wood. Up to thirty moons are then counted. The object is to calculate the time up to the great funeral wake of dead chiefs. For young people it takes place from 20 to 30 months afterwards, for old people after 10 months, for an unimportant person as soon as 3 or 4 months afterwards [7]. In Nauru, west of the Gilbert Islands, knots were tied in a string when days were to be counted, e. g. the 15 days of the confinement of a woman [8].

[1] Roscoe, *Baganda,* p. 42. [2] Kötz, p. 21. [3] Swoboda, p. 22. [4] Reed, p. 64. [5] Codrington, p. 353. [6] *Ibid.,* p. 272. [7] Thurnwald, p. 331. [8] Brandeis, p. 78.

Only seldom is it mentioned that the months are counted on the fingers, although obviously this must often happen; the Klamath and the Modok used to do so formerly [1]. Certain very primitive peoples use not only fingers and toes but also other parts of the body in counting. The day of an assembly is determined in this fashion by an Australian tribe which in words can seldom count more than four. The people touch various parts of each other's bodies — the wrist, the arm, the head — each of which stands for a special day, until the intended day is reached. Thus two or more groups can accurately determine the lapse of time and can meet on the day agreed upon [2]. The curious names of months of the Tunguses of the Sea of Okhotsk [3] are similarly to be explained, as is shewn by the method of counting the year used by the Yukaghir. They call the year *n-e' -malgil*, which means 'all the joints'. The reckoning of the months by the joints is done in the following manner. They bend the third row of phalanges of the fingers on both hands, and put them together. The line of the joining they call July. Then the knuckles of the second row of phalanges on the right hand will be August. The joints between the phalanges and metacarpals represent September; the wrist-joint is October; the elbow-joint is November; the shoulder-joint, December; between the head and the backbone will be January; the shoulder-joint on the left arm will be February; the elbow-joint, March; the wrist-joint, April; the joint between the fingers and the palm, May; and the knuckles of the second row of phalanges on the left hand, June [4].

These examples may suffice. The subject is monotonous and is of little importance for the calendar, since the days are counted independently of the latter, beginning at an arbitrary starting-point. The counting that is important for the calendar is that according to the days of the lunar month, but in this the primitive peoples hold to the concrete phenomenon of the moon. The habit of reckoning in this fashion may however be partly responsible for the fact that among certain peoples

[1] Gatschet, p. 17. [2] Thomas, *Austr.*, p. 27. [3] Above, p. 178. [4] Jochelson, *Yukaghir*, pp. 40 ff.

every day of the month has not been given a name, but the days are counted from certain points of departure, such as new moon, full moon, etc. Very rarely do we meet with a genuinely calendrical use of the tally. The Wa-Sania of East Africa, who as subjects of the Galla and later since the invasion of the Somali have been exposed to all kinds of civilising influences, make a notch for each day, and at the end of the month the stick is laid aside and a new one comes into use [1]. Similarly at the southern end of Lake Nyassa pieces of wood strung on a cord are used in counting the days of the month that have passed [2].

The Kiwai Papuans count the months by means of little sticks, which are tied into two bundles corresponding to the two seasons of the year. One end is pointed, the other oblique, and when a month has passed, the stick corresponding to it is turned round. The stick belonging to the month *keke* is provided with a top-knot and feather, that of *karongo* has a mark cut in it and a top-knot like that of *keke*, but no feather [3].

[1] Barrett, p. 35. [2] Stannus, p. 288. [3] Landtman, communicated by letter.

CHAPTER XIII.

ARTIFICIAL PERIODS OF TIME. FEASTS.

In the more fully developed calendar there are not seldom found periods of time which are reckoned without reference to any of the factors given by Nature. Such are, for example, our months, which, though historically arising from the lunar month, are now only periods of time with a definite number of days, independent of the moon. Such also is our shifting seven-day week, which, chiefly through the agency of Mohammedanism, has also been widely extended among peoples of a lower stage of development. These artificial periods, arising often from a natural period which for purposes of the calendar has been detached from its natural basis, belong to a highly developed stage of time-reckoning. Only among certain comparatively far-advanced, semi-primitive peoples does an artificial period of the simplest kind first appear, and then only one, the market-week, the origin of which it is very easy to understand.

The market-week appears in two widely separated districts — in West Central Africa, and in certain of the East Indian islands. Among the Bakongo the markets are four, viz. *konzo, nkenge, nsona,* and *nkandu.* These have given their names to the four days that comprise the Congo week. All the markets held on a certain day all over the Lower Congo are called *konzo,* all on the next day *nkenge,* etc. These markets are held at different places, e. g. all the *konzo* markets are held on different sites from all the markets held on the three successive days, and are so arranged that one in four will be within two or three miles of a town, the next day's market may be ten miles away from the first town, but

near some other town or towns, the next from 15 to 20 miles, the next perhaps 25 miles away from the first town. Thus every village has at least one market during the week within a reasonable distance of its doors. In order to describe the markets the place-names are sometimes added, e. g. *nsona Ngungu*. Each market has its special wares [1]. The Babwende have the same names [2]. Three Bantu tribes of the Congo State have the four-day week, but in certain cases with different names; one of the days is market-day [3]. This is a very practical arrangement, which must gradually have regulated itself. There are also greater markets which are held every eight days [4] — a doubling of the period, therefore. The same is the case among the Edo-speaking peoples, among whom the week is everywhere a recognised period of time, and is, properly speaking, 4 days long, this being the interval between the two markets at any given spot. Occasionally, as in the Ida district, eight-day markets are found, but the names applied to the intervening days clearly shew that a four-day week was the primary one. One of the four days is commonly known as the rest-day, and on this day men frequently stop at home, though farm-work is not absolutely forbidden. Women, on the other hand, go to market as usual [5]. Among the Ibo-speaking peoples the names of the four days are *eke, oye, afo,* and [illegible]. These are the same names as those of the Bini, but *afo* and *oye* are in the inverted order; it is idle to speculate on the origin of the names [6]. In Loango the four days are [illegible]ously named, but principally they are called *nssona, nduka,* [illegible], *nsilu,* which names are also often applied to the open spaces where markets are held on the days in question; *nssona* corresponds to our Sunday [7], i. e. it is a day of rest.

The Yoruba have, besides the market-week, a longer one of 16 (or 17) days. Of these two periods Ellis says: — The Yoruba week consists of five days, and six of them are supposed to make a lunar month, which however always begins with the new moon. (This is therefore the familiar round number.) The

[1] Weeks, *Bakongo,* pp. 199 ff. [2] Hammar, p. 156. [3] Torday and Joyce, *35,* [illegible]; 36, 47 and 277. [4] Weeks, p. 200. [5] Thomas, *Edo,* I, 18. [6] Thomas, *Ibo,* [illegible] 127. [7] *Loango Exp.,* III:2, 139.

days are: — 1, *ako-ojo,* the first day, day of general rest, considered unlucky; the temples are swept and water is brought in procession for the use of the gods. No business of importance is ever undertaken on this day. 2, *ojo-awo,* 'day of the secret', sacred to Ifa. 3, *ojo-Ogun,* 4, *ojo-Shango,* 5, *ojo-Obatula,* i. e. the name of a god, added to the word 'day'. Each of these four days is a day of rest for the followers of the god to which it is dedicated, and for them only, but *ako-ojo* is a day of rest for all. Markets are held every fifth day in different townships, but never on the *ako-ojo*. From this custom has arisen another mode of computing time, namely by periods of 17 days, called *eta-di-ogun* ('three less than twenty'). This is the outcome of the Esu societies, the members of which meet every fifth market-day. The first and fifth market-days are counted in, and thus the number 17 is obtained. For instance, supposing the second day of a month to be a market-day, the second market would fall on the 6th, the third on the 10th, the fourth on the 14th, and the fifth on the 18th. The fifth market-day, on which the members meet, is counted again as the first of the next series. These clubs are so common that the 17-day period has become a kind of auxiliary measure of time[1]. The account contains an inward contradiction. Ellis enumerates five days and says that the market is held every fifth day, but when he reckons the days again below, the periods are four-day periods. We must probably assume that the word *ako-ojo* is applied to one of the four days, denoting it to be a day of rest, and that Ellis, when he says that the market is held every fifth day, is counting inclusively according to the linguistic usage of the natives, as the Greeks also did. This is the opinion of another authority, who writes as follows: — Some say the Yoruba week is composed of four days, and some of five. This same mystification recurs in the number of days said to complete one of their months. Some say there are sixteen and others seventeen days in a month. The natives rest on the fifth day, that is to say, having counted four days, they really rest on the first day of the next week, counting that day as one. So

[1] Ellis, *Yoruba,* pp. 142 ff.

in their next great division of time they say that they rest on the seventeenth day, which is a great market-day, and this is, of course, the first day of what is their second so-called month. Fourteen of these months complete the ancient Yoruba so-called year of 224 days [1].

But there are also periods of time of other durations. The Adeli of the hinterland of Togo divide the lunar month into five weeks of six days [2]; unfortunately the brief account tells us nothing of the nature of this six-day week. The Tshi-speaking peoples usually reckon time in periods of 40 or 42 days, every fortieth or forty-second day being a festival termed the great *adae,* 18 or 20 days after which is the little *adae.* The great *adae* is always celebrated on a Sunday, and the little *adae* on a Wednesday [3]. Once again the statements are not clear. If the last condition must be absolutely fulfilled, the period of the great *adae* must always embrace 42 days and the little *adae* must fall 18 days after it. The natives consider the number 40 particularly lucky and always endeavour to connect it with some important event [4]. The probable explanation is that 40 is used as a round number instead of 42. But among the Edo-speaking peoples also, at one point in Northern Nigeria, a twenty-day month seems to be used [5]. The former mode of reckoning is connected with the seven-day week adopted by the Tshi-speaking peoples, though this, in order that it may cover the lunar month, is reckoned in a curious fashion so that each week consists of 7 days 9 hours; each so-called day is therefore somewhat longer than the natural day and consequently also begins at a different hour of the natural day. Hence the two *adae* also begin at different hours of the day. The same curious reckoning is found among the Gã-tribes. This mode of computation is a far from primitive refinement, the real object of which is the fitting of the seven-day week into the lunar month, the natural day however being abandoned. There is connected with it a strong day-superstition. The first day of the 'week' is rest-day, and that on which the new moon falls is an absolute rest-day, the follow-

[1] Above, p. 90; Dennett, pp. 133 ff. [2] Conradt, p. 15. [3] Ellis, *Tshi,* p. 216. [4] *Ibid.,* p. 219. [5] Thomas, *Edo,* I, 18.

ing being days of rest only for certain trades, e. g. the second for the fishermen, the third for the agriculturalists [1]. It is clear that the only period which can pass as native is the four-day market-week, with its development the 16-day period, and perhaps also the too little known 6-day week.

In Java, Bali, and Sumatra there is a five-day market-week called *pasar,* in Bali also a four-day *tjaturwara* [2]; alongside of these the seven-day week is in use. But wherever among heathen tribes a 'week' is spoken of, this is always the market-week [3]. In Java and Bali the *pasar*-week is combined with the 7-day week in divisions of 35 days. Six of these periods form a *wuku,* a kind of year of 210 days. Besides these there are still other divisions, which are of importance for the sooth-sayers. The non-Islamite Lampong of Sumatra combine the *pasar*-week with the lunar month, which is counted as 30 days [4]. We have here nothing to do with the highly developed time-reckoning of those peoples that drew up their systems under Indian and Islamite influence. This five-day week has a very extensive use in Further India: we meet it in Tonkin, in the Lao states of northern Siam, in Upper Burma among the Shan; further in Celebes and in certain parts of New Guinea. In the Malay Peninsula there is a five-day period for the determination of lucky and unlucky days. In other parts of New Guinea and in the Gazelle Peninsula of New Pommern the market takes place every third day. Of market-days in Polynesia there are unfortunately only uncertain accounts [5].

In ancient Mexico a market was held every fifth day at every important place, just as in Africa on different days in neighbouring districts; the day was a rest-day, and with the market games and amusements were associated. This five-day market-week appears also in other parts of Central America. The Muysca of Bogota in Columbia, on the other hand, held markets every third, and the Inca peoples every tenth, day, when the country-folk ceased from labour, assembled in the towns,

[1] Ellis, *Yoruba,* p. 149. [2] Wilken, p. 199. [3] *Ibid.,* p. 200. [4] Ginzel, I, 414 ff.; Crawfurd, I, 289 ff., Wilken, pp. 197 ff. [5] References in Webster, pp. 103 ff., where also will be found more about the African market-days.

and engaged in traffic and games [1]. These three- and ten-day periods are said to be brought into connexion with the month; if this statement be correct, they are not continuous periods, and the market-day must sometimes have been pushed out of place in order to secure the agreement with the moon; but the certainty cannot be ascertained.

The market-week exists therefore, as we should expect, only among peoples with a more fully developed commerce and trade. The rule attains greater importance for the time-reckoning only when, as in the East Indies, it is introduced into an already existing calendarial system. In Africa larger divisions of time have arisen on the basis of it, and in one case, that of the Yoruba, the agricultural year has been thus divided. The market-weeks, however, may also occur independently, alongside of the calendar, like the Roman *nundinae,* which were held every eighth day and took their name (from *novem*) from the inclusive reckoning.

The question of the Israelitish sabbath is complicated and has been much discussed as a point of connexion with the Babylonian civilisation. In Babylonia one day in the month was called *shabattu,* and the seventh day was specially distinguished. The statement that there the seven-day week existed, but as a fixed subdivision of the month, is often heard, but is an invention. I borrow the material from Landsberger's section on the month in religious worship. A cylinder of Gudea already mentions a festival of the opening of the month in Lagash, festivals in honour of the goddesses Bau and Nina are celebrated in special new-moon houses. At all times, and later too, the day of the new moon is a great festival-day. At the time of the dynasty of Ur, under the empire of Khammurabi, and later, sacrifices were offered on the fifteenth day, the day of full moon. This is called *shabattu,* which word in the time of Assurbani-pal also denotes the full-moon day without any religious implication. We also find at the time of the dynasty of Ur occasional sacrifices on the day of the 'going to sleep', i. e. of the disappearance of the moon. These are the three days marked out by the great phases of the moon.

[1] Garcilasso de la Vega, I, 6 and 35; Webster, pp. 119 ff.

According to them the month is divided into two halves. A Babylonian peculiarity is that the seventh day of the month, as at the time of the dynasty of Ur and under the empire of Khammurabi, becomes a day of special sacrifices. It is called *sibutu,* 'the seventh', cp. Assyrian *sibittu,* 'seven' (fem.). The 1st, the 7th, and the 28th are therefore of religious importance; for a similar emphasising of the 21st testimony is as yet lacking; instead of the 14th we have the 15th. Later, after ancient Babylonian times, the 7th becomes a day of taboo, the number 7 is made an unlucky number, and the schematic series 1, 7, 14, 21, 28, and 19 of the following month is formed ($30 + 19 = 49 = 7 \times 7$). Hence the 14th is also sometimes designated as the day of full moon. Thus, for example, in the Creation epic, tablet 5, vv. 12 ff.: — "At the beginning of the month shine in the land. Beam with thy horns, to make known six days. On the seventh day halve thy disc. On the fourteenth day thou shalt reach the half of the monthly (growth);" in what follows the indications of the days are unfortunately missing. It is clear that the septenary division has not arisen from the phases of the moon, but on the contrary the phases of the moon have been arranged in accordance with the septenary scheme. They might also be arranged according to a quintuple scheme. Thus the tablet III R 55, no. 3 [1]: — "Sin at his appearance from the first to the fifth day, five days, is crescent, — Anu; from the sixth to the tenth day, five days, he is kidney, — Ea; from the eleventh to the fifteenth, five days, he covers himself with the shining royal cap." It is significant of the phases of the moon that have arisen on genuinely primitive grounds that, since they are originally concrete, they do not divide themselves into symmetrical groups of days. Here the numerical scheme has been at work, and this cannot be referred to the phases, since these give no other naturally grounded divisions than the halves of the month.

The derivation of the Israelitish sabbath from Babylonia therefore offers two difficulties: — 1, in regard to the word, Babylonian *shabattu* means the day of full moon, in fact the fifteenth day of the lunar month, and Hebrew *shabbat,* so far

[1] Quoted from Hehn, p. 114.

as we know, the seventh day of a period that is shifting in relation to the lunar month; 2, in regard to the period of time, in Babylonia the septenary scheme is a fixed division of the lunar month; among the Israelites it is, so far as we know, shifting, continuous, and independent of the lunar month.

I have emphasised the phrase 'so far as we know' since in reality our sole knowledge in this direction of the Israelitish times before the Exile is that a festival and rest-day called the sabbath existed: of its nature we know nothing. The earliest evidence we have of it is the story of one of the miracles of Elisha [1], from which it appears that the adherents of the prophet were accustomed to gather round him on this day and at new moon, doubtless since both were rest-days. In the same way sabbath and new moon are mentioned together as festival days in Amos VIII, 5, Hosea II, 11, Isaiah I, 13. The writers during and after the Exile are the first to mention the sabbath as the seventh day of a continuous seven-day week. It has at that time the character of an ascetic rest-day, where the rest is not a joy but a duty.

Any further advance can only be made by way of hypothesis. Thus the sabbath of the times before the Exile was either, as later, the last day of a seven-day period that was shifting in relation to the lunar month, or else it was something different. Both statements are hypotheses. And if it was something different we are driven to a still further hypothesis in order to decide what it was. The suggestion most in favour is that it was the day of full moon. The sabbath is said to be the second principal day of the course of the moon simply because sabbath and new moon are always mentioned together in the days before the Exile. But this obviously proves nothing. It has further been stated that the sabbath must be a fixed day of the lunar month, since otherwise it would sometimes coincide with the day of new moon; but evidently the expression 'new moon and sabbath', however formally interpreted, does not in itself exclude such a coincidence. Further sabbath and *shabattu* are the same word, and consequently a

[1] II Kings, IV, 23.

second hypothesis is that 'sabbath' as well as *shabattu* means the day of full moon. The proof is only binding if the word in itself must mean 'full moon'; the etymology however is disputed, so that it gives no help. It is not difficult to establish a general fundamental sense which will fit in both with the festival-day of full moon and of the seven-day period.

On the ground of the researches here carried out, however, we may put a question a satisfactory answer to which is demanded by the hypothesis just mentioned: — How is it possible for a period which forms a fixed subdivision of the lunar month to become detached from the moon and be made into an independent period shifting in relation to the lunar month? And there will still be a preliminary question to get rid of, viz. how has the septenary period arisen from the day of full moon, the 15th day of the month? The answer will be, I suppose, that the 14th, not the 15th, was taken as the day of full moon and that Babylonian influence introduced the septenary division, so that the name of one of the septenary days, the 14th, has been carried over to the rest. But since in the legislation of the Exile the great festivals were appointed for the 15th, it is clear that this day, and not the 14th, was at that time taken as the day of full moon. The question whether any late Babylonian speculation in numbers may have exercised a determinative influence upon the Jewish legislation must be decided by experts. From the unsatisfactory answer to the preliminary question I return to the main question. A shifting reckoning of this kind can only be understood chronologically as a breaking away from the concrete phenomena of Nature, an incomplete calculation being established instead of the empirical observation, as was the case, for instance, with the Egyptian shifting year, put in place of the solar year, and bringing with it months of thirty days in the place of lunar months. Now the Israelites have always had the lunar month. That a day determined by the moon should be detached from the living lunar month and made into a shifting seven-day week is quite incomprehensible and entirely without analogy. The Babylonian septenary days do not help us here, since they always remained days of the lunar month. In the light of the

foregoing investigations into primitive chronology such a process would be a sheer miracle.

It remains therefore to regard the creation of the seven-day week as an act of pure volition on the part of the makers of the refined exilian legislation, who took the name of the ancient sabbath, a festival-day of uncertain position, and applied it to the seventh day of a shifting period. And this is equally difficult either to prove or disprove. It is seldom found that a new creation proceeds entirely from nothing, and no analogy to the shifting seven-day period is anywhere to be met with — except in one case to be mentioned presently, the market-week. Especially in matters chronological would it appear that the Jewish legislation did not radically break with antiquity, but systematised and cultivated already existing tendencies, if we may judge by the few points of departure handed down from the earlier period; hence the numbered months, hence the fixing of the great festivals on the day of full moon. We are speaking here not of the changed religious character of the sabbath, but of the chronological question. If therefore fundamental grounds are lacking for the creation of a shifting seven-day period by the legislation of the Exile, we must cling to the other hypothesis, viz. that in pre-exilian times also the sabbath was the seventh day of a shifting period, which the legislation has transformed in its own fashion.

But if the shifting sabbath is old, the question arises whether analogous periods exist in primitive time-reckoning. Certainly they do, and they are periods of a quite definite nature, — the market-weeks. There are market-weeks of three, four, five, six, eight, and ten days: that seven does not appear in any example must therefore be an accident. The market-week is spread over the whole earth at a more advanced stage of civilisation. The market-day is a rest-day, since the people go to the market: since they rest and gather together it is therefore a festival day. So also with the Roman *nundinae,* on which no public meetings were held and the schools were closed. The dispute of Roman scholars as to whether the *nundinae* were religious festival-days or business-days is signi-

ficant [1]. Since the market-day is a day of rest, however, it is also, as in West Africa, made a taboo day on which work is forbidden. The connexion between the market and religion is universal and appears particularly clearly in heathen Arabia [2]. It is true that no market-day is attested for ancient Canaan, but even in pre-Israelitish times the land was already covered with towns, so that the conditions for regular markets were the same as in ancient Greece and Rome. From post-Biblical times at least three great annual markets are known; one was held at the terebinth of Hebron, which was at the same time the object of a cult. In Midrash it is allowed to visit a heathen yearly market at the half-holidays of the Passover and of the feast of Tabernacles [3]. Since the day was a rest-day, the command for rest might gradually, through a new interpretation, be applied to the original purpose of the market, viz. trade. In Amos VIII, 5 the traders complain: — "When will the new moon be gone, that we may sell corn? And the sabbath, that we may set forth wheat? making the ephah small," etc., but the command for the absolute sabbath's rest was certainly not carried out at that time, nor yet in the time of Jeremiah [4]; after the overthrow of the Jewish monarchy the trade of the markets on the sabbath revived, if indeed it had ever perished. Nehemiah, three centuries after Amos, has to give the injunction: — ". . . and if the peoples of the land bring ware or any victuals on the sabbath day to sell, that we would not buy of them on the sabbath, or on a holy day [5]," and the breach of this law is sternly reprimanded: — "In those days saw I in Judah some treading wine-presses on the sabbath, and bringing in sheaves, and lading asses therewith; as also wine, grapes, and figs, and all manner of burdens, which they brought into Jerusalem on the sabbath day . . . There dwelt men of Tyre also therein, which brought in fish, and all manner of ware, and sold on the sabbath unto the children of Judah, and in Jerusalem." Nehemiah reproves the nobles: — "Did not your fathers thus, and did not our God bring all

[1] Macrob., I, 16, 28 ff. [2] Above, pp. 251 f. [3] W. Backer, *Zeitschr. f. d. altest. Wiss., 29,* 1909, 148 ff. [4] Jerem. XVII, 21 ff. [5] Nehem. X, 31.

this evil upon us, and upon this city?", and he has the gates shut and guarded when it grows dark before the sabbath. When, notwithstanding this, the merchants once or twice encamped outside the walls on the sabbath, he drove them away with threats[1]. At this time work was performed and trade carried on on the sabbath, though certainly it does not follow that the sabbath was the principal market-day of the week: we are speaking of a large town, where no doubt there was a market every day. But it would be quite in keeping if in smaller matters the sabbath had once been the proper market-day.

The work of Webster culminates in an attempt to explain the sabbath. The author brings together abundant material for the practice of assigning certain taboos to certain days, partly notable days in the experience of human life, such as birth, death, etc., and partly those regularly recurring days which are dependent on superstitious and religious ideas. Among these days are found both the market-day and the days of the principal phases of the moon, — the day of new moon, in a lesser degree the day of full moon, and further also the days of the darkness, of the moon's invisibility. He rightly distinguishes the continuous Israelitish week from the 'unlucky days' of the Babylonians, but is nevertheless of the opinion that the sabbath is really the day of full moon, which in this character was overlaid with certain taboos and has become independent of the moon. How this separation was effected, Webster does not explain: he merely makes the statement. He has not felt the decisive difficulty, which lies just in this point, because he has not attacked the problem from its chronological side. There is no reason to suppose that the day of full moon could become detached from the genuine lunar month, and such a process would seem still more strange since the day of new moon remained a genuine new-moon day. On the other hand the development of market and rest-day into a day of taboo is everywhere natural, and is attested in the above examples from Africa; this taboo character was emphasised.

[1] Nehem. XIII, 15 ff.

and inculcated by the late Jewish and exilian legislation in opposition to the old festive merry-making. The new-moon day, which had fallen out of the scheme, was at the same time rejected and proscribed. The suggestion that the sabbath arose from the market-day is certainly only a hypothesis, since a definite market-day is not demonstrated for Canaan; but it has the advantage of remaining within the limits of primitive time-reckoning, which knows no other continuous periods than the market-weeks.

Festivals and time-reckoning are from the beginning inseparably bound together. Some of the former have already been dealt with, e. g. the festivals of the new moon, the full moon, and the beginning and end of the year. It remains briefly to sketch the development of this connexion and to illustrate it with a few examples. A detailed discussion would lead us too far away from the main theme into the domain of the history of religion. How many pages have been written about the New Year festival alone!

The connexion between festivals and time-reckoning is grounded in the fact that both are originally dependent on the phases of Nature. Festivals are already held at definite times of the year by peoples who know nothing of a proper time-reckoning, e. g. the much-discussed Intichiuma ceremonies of the aborigines of Australia. They are closely associated with the breeding of the animals and the flowering of the plants with which each totem is respectively identified, and as the object of the ceremony is to increase the number of the totemic animal or plant, it is most naturally held at a certain season. In Central Australia the seasons are limited, so far as the breeding of animals and the flowering of plants is concerned, to two — a dry one of uncertain and often great length, and a rainy one of short duration and often irregular occurrence The latter is followed by an increase in animal life and exuberance of plant growth. In the case of many of the totems it is just when there is promise of approach of the good season that it is customary to hold the ceremony. The exact time

is fixed by the *alatunja* (the chief of the local group)[1]. The ripening of a plant which is an important article of food is often accompanied by certain ceremonies by which the eating of the fruit is first made lawful. These so-called sacrifices of the first-fruits, which have been touched upon above[2], are therefore dependent upon a definite natural phase, and there may be several of them in the course of the year.

At seed-time a festival is celebrated in order to secure the good growth of the seed. The Bahau of Borneo, who have the agricultural year[3], celebrate two great festivals, one at the sowing (*tugal*, from *nugal*, 'to sow'), and one after harvest, the festival of the new rice-year, *dangei*, which however is not held if the harvest has failed; it is the climax of the year. At both festivals the people gorge themselves to the full, rice being given even to the animals. But during the period of growth also the plants need protection and blessing, various plants require and obtain different festivals, so that a cycle of agricultural festivals arises[4]. The southern tribes of the Malay Peninsula celebrate three great agricultural festivals in the year, one after the transplanting of the young rice-plants, another after the formation of the fruit, and a third after the harvest[5]. As an example of a fully developed festival-cycle of this kind I give the festivals of the Bontoc Igorot, with which should be compared the section on the agricultural year of this tribe[6]. After the conclusion of the time when rice-seed is put in the germinating beds, *pa-chog*, the festival *po-* is held, after the transplanting of the rice the festival *chaka* held on Feb. 10 in 1903), and after that an unexplained festival *su-wat;* on the day on which the first 'fruit-heads' have shown themselves on the growing rice there is the festival *ke-eng*, and on the following day *tot-o-lod; sa-fo-sab*, before the beginning of harvest, introduces the harvest. At the end of the rice-harvest and the beginning of the period called *lïpas* ('no more rice-harvest') *lislis* is celebrated; at the time of the planting of camotes *loskod*; in the same division

[1] Spencer and Gillen, *Nat. Tribes*, pp. 169 ff. [2] P. 336. [3] Above, p. 68. [4] Nieuwenhuis, I, 161. [5] Martin, p. 290. [6] Above, pp. 68 f.

of the year, called *bali-ling,* the festival *o-ki-ad,* when black beans are planted. Finally at the end of this division we have *ko-pus,* a three day's rest, just before the work of rice-culture is begun again [1]. An African example from the neighbourhood of the Lower Niger will shew how in this agrarian festival-cycle other feasts arise which may in part be older. The cycle consists of the following festivals: — 1, sacrifices and adoration to the great spirit or creator, always made in anticipation of the new crop, to ensure that it is good; 2, communion of first-fruits, a festival to the household gods; 3, communion of the new yam; 4, the feast of hunters; 5, *ofala,* a celebration to Ofo, god of justice and right, in honour of the public appearance of the king; 6, the *crumbo,* or remnants of yam, reserved for the king only; 7, the feast of roast yam at the close of the year, the termination of this marking the end of the native year and the feast also serving as a form of public notice that farming has to recommence. This is a festival in honour of Ifejiohu, god of the crops, as a token of gratitude on the part of the community for a fruitful and prosperous year. It is usual for the king to give a month's notice before each ceremony takes place [2].

A pastoral people may also have a well-developed festival-cycle marking the points of the year which are important for their herds. I quote as an example the main festivals of the Reindeer Koryak of Eastern Siberia. There is a ceremony on the Return of the Herd from the summer pastures, when the first snow covers the ground. In spring, when the fawning period is over and the reindeer have lost their antlers, the fawn festival is celebrated. The fire in the house is put out and a new one started by means of the sacred fire-board. Some tribes pile up the antlers of the slaughtered reindeer. Other festivals are observed: — 1, when the sun marks the approach of summer after the winter solstice: a sacrifice is then offered to the sun; 2, in the month of March, when the does commence to fawn: a sacrifice is offered to The-One-on-

[1] Jenks, pp. 206 ff. [2] Leonard, pp. 434 ff.

High; 3, in spring, when the grass commences to sprout and the leaves appear on the trees; 4, when mosquitoes put in their appearance — reindeer are then slain as an offering to The-One-on-High, lest the mosquitoes scatter the herd [1].

Here the development is simple and clear, but not so among many peoples where agriculture or the raising of cattle does not occupy so important a place. The Maidu of northern California have four seasons and four festivals founded by the hero Oankoitupeh: — 'the open air festival' in the spring, 'the dry season festival' about the first of July, 'the burning to the dead' about the first of September [2], and 'the winter festival' about the last of December [3]. The connexion with the seasons is clear, but we do not even know whether the names are of genuine native origin. This example clearly shews that the great difficulty lies in the fact that the real nature of the festivals is unknown. But often where detailed accounts of a festival exist, the original reason for it becomes obscured in the course of the development, so that the original connexion between festival and season cannot be established. This is especially the case with peoples among whom the religious life has had an especially strong development.

A phenomenon peculiar to the peoples of the far North is that the winter is the time of the festivals. The summer is the good season, when supplies for the winter must be collected; it is therefore a very busy time, when each family has to work for itself and has no leisure for festivals. The winter is the time of rest, in which the people live on the supplies already collected; they naturally crowd closer together, and have much leisure, which is used for religious ceremonies and for games. Hence the winter is the time of the religious ceremonies among the Eskimos, the Tlinkit, and other Indians of N. W. America [4], and hence the Yule festival

[1] Jochelson, *Koryak*, pp. 86 ff. [2] Cp. above, p. 269. [3] Powers, p. 305. [4] Cp. Mauss, *Essai sur les variations saisonnières des sociétés Eskimos, L'année sociologique, 9*, 1904-5, pp. 96 ff. That the time of freedom from work should become a festival time is obvious and is simpler than Mauss seems to think; the point deserved noting among other peoples also.

celebrated in the winter becomes the greatest festival of the Scandinavian peoples[1].

When a festival takes place, people assemble together who often have to come long distances. We have spoken above[2] of the devices adopted in order to ensure that the day of an appointed non-periodic festival shall not be missed. Periodically recurring festivals, which are connected with a natural phase or some occupation, particularly if this is agricultural, are determined as to time, but not accurately. Hence it is already found among the Central Australians that the exact day is fixed by the chief. Such festivals, appointed within certain limits assigned by Nature, are found also among peoples with a fixed calendar, e. g. the Roman *feriae conceptivae*. Significantly enough, these are agricultural festivals which, on account of the change of position of the lunisolar year in relation to the natural year, could not well be regulated by the former. But where a calendar exists, this is the given means of regulating the festival dates so that preparations can be made and the people can assemble at the right time. In the natural and agricultural years the festivals are in the proper sense *conceptivae;* the question is properly to find a means of accurately fixing the day within the short periods given by Nature. This purpose is served by the calculation from the moon. The moon herself has her festivals, especially that of the new moon and, though more seldom, that of the full moon[3]. Thus the festival times are regulated by the moon. In itself any suitable day of the month can be appointed as a feast-day, but custom and superstition cause certain days to be preferred. Thus the day of new moon, since it was often already a feast-day in itself, was bound to be preferred. The Natchez of Louisiana, for instance, celebrated at each day of new moon a feast which took its name from the animals and plants which the preceding month had principally brought forth, but the greatest festival was that held at the new moon of the first month.[4]

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[1] Cp. my *Årets folkliga fester*, p. 161. [2] Pp. 320 ff. [3] Above, pp. 151 ff. [4] Du Pratz, II, 354 ff.

It is a very wide-spread idea that things which are to prosper and grow should be undertaken during the time of the waxing moon, and that anything begun when the moon is on the wane will dwindle and die. Hence the proper time for a festival is the bright half of the moon, and especially the time at which the moon has attained her full shape. It is not only on account of the fair light which costs them nothing that the negroes dance on the nights of full moon. In Dahomey the festivals take place at the full of the moon, and the days are determined by the native government [1]. In Burma all religious festivals with the exception of the New Year festival, the date of which is regulated in a special manner, take place at the time of full moon [2]. Throughout Australia, Tasmania, and Melanesia the festivals begin either at full or new moon [3].

In regard to the Israelitish festivals, the antiquity and great importance of the new moon festival has already been pointed out [4]. The Jews here follow a wide-spread custom. Whether they, like many other peoples, also preferred the time of full moon for their festivals, is a more difficult question. A fixed day for the Passover and Feast of Unleavened Bread and for the Feast of Tabernacles is first prescribed during and after the Exile, the last-named on the fifteenth day of the seventh month, the Feast of Unleavened Bread on the fifteenth day of the first month, and the Passover on the evening of the day before (the fourteenth of the first month) [5]. The only other information we have from ancient times as to the date of the Feast of Tabernacles is contained in the earlier name 'Feast of Vintage'; it was celebrated after the conclusion of the fruit-harvest and vintage. In regard to the Feast of Unleavened Bread—since it is with this chiefly that we have to do, not with the preliminary Feast of the Passover associated with it, which was a feast of a different nature—the order of the Yahwist runs 'at the time appointed in the month Abîb' [6]; as a motive is adduced the fact that the Jews came

[1] Foa, p. 120. [2] Nisbet, II, 287. [3] Kötz, p. 21. [4] P. 331; cp. the handbooks, and Förster's essay. [5] Lev. XXIII, 5, 6, and 34; cp. Ezekiel XLV, 21 ff. [6] Exod. XXXIV, 18, XXIII, 15, *le moed chodesh ha-abib;* cp. Exod. XIII, 4 ff.

out from Egypt in this month. The Deuteronomist [1] transfers this to the preliminary festival. The time therefore, like that of the Feast of Vintage, is determined by an event in agriculture, but at the same time by the moon. Linguistically *chodesh* can here mean 'new moon'; in that case we could also translate 'at the time appointed after the new moon of Abib'; but since the sense 'month' is so old and the original sense 'new moon' appears unequivocally only where monthly new moon festivals are in question [2], it seems reasonable to translate the word here simply by 'month'. Now it is often stated that the festive seasons both of the Unleavened Bread and of the Feast of Vintage were regulated purely by natural circumstances: the former was celebrated when the first ears ripened, and the latter when the fruit-harvest was at an end, each according to local conditions. But the Feast of Vintage at least was a general festival even in Canaanitish days [3], and *moed* properly means 'determined, appointed time'. It was therefore not accidental circumstances but a rule that in early times called the people together to the festival. Chronological regulation is proved by the name of the festival of harvest *(chag haq-qazir)*, 'Feast of Weeks', *chag shabuot* in the Yahwist [4]. The regulation by the weeks, however, is late and artificial in comparison with that by the moon.

Now if we know what part was played by the time of full moon in the festivals of other peoples, and indeed for the agrarian peoples also, in spite of the differences in date resulting from the observation of the time of full moon, it seems always probable that the regulation of post-exilian times for the fifteenth originated in an old tradition in accordance with which the time of full moon was specially favoured for the feast. Earlier the date was not so accurately observed; the time of full moon was prescribed so that those who were prevented from celebrating the Feast of the Passover at the proper time might do so on the fourteenth of the following month [5]. Unfortunately the date of the passage in I Kings (XII,32), according to which

[1] XVI, 1. [2] Above, pp. 235 f. [3] Judges IX, 27; XXI, 19 f.; Nowack II, 151. [4] Exod. XXXIV, 22. [5] Numbers IX, 11 ff.

Jeroboam celebrated the Feast of Tabernacles on the 15th day of the eighth month, is doubtful; if the passage is old, it affords valuable evidence that the time of full moon was the proper time for holding agrarian festivals [1].

Among the Greeks all the ancient festivals with the exception of the feasts of Apollo, which always took place on the seventh of the month, were concentrated in the period shortly before and during full moon [2]. The selection of days is organically connected with the lunar reckoning, and the superstition of days has arisen independently among different peoples. As an example the sacrifices of the Toba Batak of Sumatra may serve. "At the felling of a tree for house-building sacrifices must be offered during the waxing moon; this is in general the favourable time, since everything undertaken then increases with the moon. The huntsman sacrifices to his god at noon-tide about the time of new moon, the fisherman at noon while the moon is waxing; before a military expedition a certain sacrifice is offered (preferably in the early morning) at the time of full moon, and another at the waxing moon [3].

This superstition, which involves the accurate knowledge and observation of the days, and the injunction, to which great religious importance is attached, to celebrate the festivals on the proper days, lead to the result that the time-reckoning, which arose in the first place from the events and necessities of practical life, has among certain peoples passed completely under the influence of religion and has been further developed from ecclesiastical standpoints in the service of the religious cult.

There are however other ways of exactly fixing a day, viz. by observation of the stars and of the solstices and equinoxes. The former method is hardly ever used directly as a means of determining religious dates, and this fact is very significant for the practical character of the observation of the stars. No religious ideas are associated with the phases of the stars, although star-myths innumerable are related.

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[1] Perhaps Solomon also celebrated the dedication of the Temple and the Feast of Tabernacles in the same month: Nowack, II, 151, n. 2. [2] Cp. my article in *Arch. f. Religionswiss., 14,* 1911, p. 441, and my *Entstehung etc.*, p. 33. [3] Warneck, pp. 350 ff.

The reason is not easy to discover. A contributory factor may be that although the observation of the stars is widespread, it is yet not a matter which concerns every man, and also that the stars always give only a single point of time and do not form cyclical periods within the year, though on the other hand they are intimately connected with the phases of the natural year and with agriculture. The principal reason may be conjectured to be that the reckoning of months, on account of its connexion with the popular festival seasons and with the selection of days, has been from the beginning chiefly carried out with a view to religious considerations.

It is only among certain peoples that the observation of the solstices and equinoxes plays any great part, and that consequently the religious importance of the sun is also great. But the festivals of the solstices and equinoxes, recurring at regular intervals in the course of the year, are far from being able to compare with those of the phases of the moon. It has already been mentioned that the Eskimos were able accurately to observe the winter solstice [1]. At this time, about the 22nd of December, they held a festival to rejoice over the return of the sun and the good hunting weather. They collected together from all over the country in great parties, entertained one another in the best possible manner, and when they had gorged themselves to the full they got up to play and to dance [2]. Certain Indian peoples have made quite a special custom of the observation of the solstices and equinoxes. Thus for instance did the Inca people, but they had lunar months also, and even the great festival of the sun in December was regulated by the days of the lunar month [3]. The Zuñi determine the festival times by the observation of thirteen different positions of the sun on the horizon, but they have also lunar months, five of which are named from natural phases, and six from colours borrowed from certain rites [4]. The ceremonies are therefore still distributed among the months, and the most obvious explanation is that the observation of the thirteen positions of the sun really serves to determine the thirteen months, and

[1] Above, p. 312. [2] Cranz, p. 229. [3] Above, pp. 196 and 313. [4] Above, pp. 195 and 313.

with them the times of the rites. The old Mexican calendar seems to have no connexion with the moon, but in Ginzel's opinion this does not exclude the possibility of an earlier development on the basis of a relationship with the course of the moon [1]. In any case the regulation of the festivals by the positions of the sun is a comparatively isolated separate development among certain peoples; the regulation by the moon, on the contrary, is found all over the world.

Because the calendar is principally looked upon as the concern of religion, the months appear in such close association with the festivals held in them that it is sometimes found that the relationship to the phases of Nature falls into the background. Among peoples who have no names of months, like the Greeks of the Homeric period, or among those who name only some of them, it may therefore happen that the months become named from the festivals or perhaps that such names supersede those which refer to natural phases. Thus, as has been mentioned above, six months of the Zuñi year are named from the colours of the prayer-sticks. Of the Inca months one is named from a moon festival, two from provincial festivals, and one from the great sun festival; the rest take their names from the occupations of agriculture [2]. Of the tribes of Bolivia it is stated that their knowledge of the calendar is not according to days, but according to the principal festivals [3]. In Africa two examples have been given [4], those of the Hausa states and the Edo-speaking peoples. In the Babylonian calendar the names of months derived from festivals spread more and more, at the expense of names of other kinds [5]. The phenomenon is therefore comparatively rare and is found only among peoples who have a highly developed religious cult, and even in the examples here given the process is not consistently carried out.

Consistency is found only in one case, the calendar of ancient Greece, and is all the more striking since in the hundreds of varying calendars of the town-states no names which do not refer to festivals have been with certainty demonstrated;

[1] Ginzel, I, 436. [2] Above, p. 196. [3] Chervin, p. 229. [4] Above, pp. 204 f. [5] Above, pp. 228 ff.

the few calendars with numbered months are of more recent origin [1]. The certain conclusion is that the Greek calendar was entirely regulated from the point of view of the religious cult. Where on the other hand the place of the lunisolar year is taken by another reckoning, it is found that the lunar reckoning is still used in the establishing of certain festivals, as for instance in Bali [2], and by the Christians in the matter of Easter and the festivals depending thereon.

[1] Cp. my *Entstehung etc.*, pp. 51 ff. [2] Friederich, p. 88.

CHAPTER XIV.

THE CALENDAR-MAKERS.

As long as the determination of time is adjusted by the phases of Nature which immediately become obvious to everyone, anybody can judge of them, and should different people judge differently there is no standard by which the dispute can be settled, because the natural phases run into one another or are at least not sharply defined. The accuracy in determination demanded by time-reckoning proper is therefore lacking. Accuracy becomes possible as a result of the observation of the risings of stars, and this observation begins even at the primitive stage, but it is not a matter that concerns everyone. It requires a refined power of observation and a clear knowledge of the stars, so that the heavens can be known. This is especially the case with the commonest observations, those of the morning rising and evening setting. The observer must be able to judge, by the position of the other stars, when the star in question may be expected to twinkle for a moment in the twilight before it vanishes. The accuracy of the time-determination from the stars depends therefore upon the keenness of the observation. In this the individual differences of men soon come into play, along with a regular science which introduces the learner to the knowledge of the stars and its uses. Thus Stanbridge reports of the natives of Victoria that all tribes have traditions about the stars, but certain families have the reputation of having the most accurate knowledge; one family of the Boorung tribe prides itself upon possessing a wider knowledge of the stars than

any other [1]. An account has been given above [2] according to which an old chief instructed the young people of the tribe in the knowledge of the stars and the occupations which these announce. Of the Torres Straits tribes Rivers says: — When the rising of a star is expected, it is the duty of the old men to watch; they rise when the birds begin to call and watch until daybreak. As in the case of *kek* (Achernar, the most important star), so also probably in the case of other important stars and constellations the appearance of certain other stars is a sign that the star expected will soon appear. For *kek* the stars in question are two named *keakentonar;* when they appear on the horizon at dawn, it is known that in a few days *kek* will shew himself, and the observation becomes especially keen. The setting of a star is observed in the same way [3].

By the phases of the stars both occupations and seasons are regulated, and thus a standard is furnished by which to judge, and a limit is set to the indefiniteness of the phases of Nature. An old missionary relates of the Orinocese that it is incredible how confused their minds become if they neglect to observe the signs which make known the approach of winter; they may then say in winter that one or two months are yet wanting, and in the height of summer they sometimes spread the report among their countrymen that the winter will soon be upon them; the evening setting of the Pleiades announces the coming of winter and therefore affords a means of correcting the time-reckoning [4].

The moon strikes the attention of everyone and admits of immediate and unpractised observation; at the most there may sometimes be some doubt for a day as to the observation of the new moon, but the next day will set all right. But because the months are fixed in their position in the natural year through association with the seasons, the indefiniteness and fluctuation of the phases of Nature penetrate into the months also, and are there even increased, for the reasons stated above. Cause for doubt and disagreement is given, the

[1] Brough-Smyth, I, 432, quoted by Kötz, pp. 26 f. [2] Pp. 132 f. [3] *R. T. Str.*, p. 224. [4] Gilij, II, 21.

problem of the regulation of the calendar arises. Hence in the council meetings of the Pawnee and Dakota it is often hotly disputed which month it really is. So also the Caffres often become confused and do not know what month it is; the rising of the Pleiades decides the question. The Basuto in determining the time of sowing are not guided by the lunar reckoning, but fall back upon the phases of Nature; intelligent chiefs however know how to correct the calendar by the summer solstice [1].

The differences in intelligence already make themselves felt at an early stage, and are still more plainly shewn when we come to a genuine regulation of the calendar. Some of the Bontoc Igorot state that the year has eight, others a hundred months, but among the old men who represent the wisdom of the people there are some who know and assert that it has thirteen [2]. The further the calendar develops, the less does it become a common possession. Among the Indians, for example, there are special persons who keep and interpret the year-lists illustrated with picture-writings, e. g. the calendrically gifted Anko, who even drew up a list of months [3]. It is very significant that even where a complete calendar does exist, it will be found that this is not in use to its fullest extent among the people. The Masai days of the month have already been given [4]; but the nomenclature of the days is not so popular throughout that any Masai on any day could determine that day with perfect accuracy. Only the following days and groups of days are in regular use: — The 1st day, as the beginning of the counting and of the brightness of the moon *(sic!)*, the 4th as the new moon, the 10th as the final day of the first decade, the 15th as the final day of the moon's brightness, the 16th as the beginning of the dark half of the month, the 17th as the chief of the unlucky days, 18—20 as *es sobiam*, the 20th as the final day of the second decade, 21—23 as *nigein*, the 24th as the beginning of 'the black darkness', and from the 24th on to the disappearance of the moon. Of these days the 4th, 10th, 17th, 24th, and 1st are

[1] Above, p. 241. [2] Jenks, p. 219. [3] Above, pp. 103 f. [4] Above, pp. 169 f.

especially common. The people therefore count in a more concrete fashion than those who are learned in the calendar.

It follows that the observation of the calendar is a special occupation which is placed in the hands of specially experienced and gifted men. Among the Caffres we read of special 'astrologers' [1]. Among the Kenyah of Borneo the determination of the time for sowing is so important that in every village the task is entrusted to a man whose sole occupation it is to observe the signs. He need not cultivate rice himself, for he will receive his supplies from the other inhabitants of the village. His separate position is in part due to the fact that the determination of the season is effected by observing the height of the sun, for which special instruments are required. The process is a secret, and his advice is always followed [2]. It is only natural that this individual should keep secret the traditional lore upon which his position depends; and thus the development of the calendar puts a still wider gap between the business of the calendar-maker and the common people.

Behind the calendar stand in particular the priests. For they are the most intelligent and learned men of the tribe, and moreover the calendar is peculiarly their affair, if the development has proceeded so far that value is attached to the calendar for the selection of the proper days for the religious observances. We are not told that the Kenyah who has charge of the calendar is a priest, but among the Kayan (also of Borneo) it is a priest who determines the seed-time from the observation of the ecliptic, and on the upper Mahakam a priestess [3]. In Bali the Brahmins, in Java the village priests, determine the seasons by observing a crude sun-dial [4]. Of the Tshi-speaking peoples it is said that the priests keep a reckoning of the time, using different methods for the purpose, and make known the approach of the annual festivals [5]. Among the Hausa the priests determine the time of the festivals according to the position of the moon [6]; here also the months

[1] Macdonald, p. 291. [2] Hose and Mc Dougall, pp. 106 ff.; cp. above, p. 318. [3] Above, pp. 318 and 317. [4] Crawfurd, I, 300 f. [5] Ellis, *Tshi*, p. 216. [6] Mischlich, p. 127.

are named after the festivals. To a very general extent it is true among peoples like the Indians of Arizona, where the religious ceremonies are the centre of the life of the tribe, that the priests are the calendar-makers. Among the Hopi the priests determine from the observation of the solstices and equinoxes the time for the religious ceremonies and for the agricultural labours[1]. Among the Zuñi the priest of the sun is alone responsible for the calendar. He takes daily observations of the sunrise at a petrified tree-stump east of the village, which he sprinkles with meal when he offers his matins to the rising sun. When the sun rises over a certain point of the Corn Mountain he informs the elder brother Bow priest, who notifies a certain religious body, the members of this society come together and the great feast of the winter solstice is then celebrated. The summer solstice and its festival are determined in similar fashion[2].

Among the priests there is formed a special class whose duty it is to make observations and keep the calendar in order. Among the Hawaiians 'astronomers *(kilo-hoku)* and priests' are mentioned[3]; they handed down their knowledge from father to son; but women, *kilowahine,* are also found among them[4]. Elsewhere the nobles appear alongside of the priests; thus in Tahiti it is the nobles that are responsible for the calendar, in New Zealand the priests. In the latter country there is said to have been a regular school, which was visited by priests and chiefs of highest rank. Every year the assembly determined the days on which the corn must be sown and reaped, and thus its members compared their views upon the heavenly bodies. Each course lasted from three to five months[5].

For Loango it is reported that the king's star-gazers apparently took observations from a little wood; further that they sometimes knew how to arrange matters to suit their own convenience, for they gave out (probably when the sky

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[1] Fewkes, pp. 258 ff.; cp. above, p. 313. [2] Stevenson, p. 108 f.; cp. above, p. 312. [3] W. D. Alexander, quoted by Malo, p. 59, n. 7. [4] Bastian, quoted by Kötz, p. 62. [5] White, quoted by Kötz, p. 63.

was clouded) that the moon was several days old, and thus gained a couple of hours for the rising of Sirius and could postpone the dreaded thirteenth month until the end of the next year [1]. In these districts, where a strong day-superstition prevails, external influence is doubtless probable, but the account is significant in that it speaks for an artificial retardation of the calendar. Such a manipulation is characteristic of the professed calendar-maker.

The king himself also takes charge of the calendar. The Inca observed the solstices in person, and was assisted in so doing by the cleverest of his people; the priests assembled to determine the equinoxes [2]. The calendar of the Society Islands was fixed by King Pomare and his family [3]. That the Inca appeared in a priestly office for this purpose is certain; that Pomare did the same is doubtful, since European influence has no doubt been brought to bear upon this case.

The examples just given are not numerous, and this corresponds to the actual state of affairs, since we have here to do with the treatment of a genuine calendarial science by certain peoples, — only at a quite undeveloped stage can questions of the time-reckoning be dealt with in a deliberative assembly — and our researches are concerned with primitive peoples. The end which the calendar-maker has in view is the establishing of an ordered series of days marked out into divisions, the series being kept in place by certain fixed points, and recurring cyclically. First of all the regulation of the lunisolar calendar is his principal task, and it is one which everywhere takes the chief place. For this purpose the calendar-maker must become accurately acquainted with the course of the sun and with the stars. Here the four solstices and equinoxes are distinguished by their recurrence at tolerably regular intervals of time; the stars however cannot of themselves be brought into a system with equal intervals of time, but are only applied to such a system in order to fix it. Hence it follows that the observation of the solstices and equinoxes has,

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[1] *Loango Exp.*, III:2, 138, note; cp. above, p. 248. [2] Above, p. 313. [3] Above, pp. 212 f.

at least in single cases, been erected into a calendric system, but the observation of the stars not so — except in Babylon — although they also are observed, so that they come to be accurately known, and the planets are even discovered, e. g. by the Polynesians. The calendar and practical life become to some degree separated from each other; the first lays the principal emphasis upon the correct ordering of the series of days, which is of especial importance on religious grounds for the selection of days and the fixing of the right day for the religious observances; in practical life, however, the point of chief importance is to determine the times when the various occupations may be begun and sea-voyages undertaken, both of which depend upon the solar year, and for this the stars afford the best aid. Hence it happens that sometimes the reckoning by the stars appears, as one more profanely determined, in a certain opposition to the lunisolar reckoning, which has a more religious character. This happened in ancient Greece, where the stars served for the time-reckoning of sailors and peasants while the lunisolar calendar was developed and extended under sacral influence; the festival calendar, which was regulated and recorded by the moon, became the official civil calendar. It was only later that the stellar calendar was systematically brought under the influence of the fully developed astronomy and of the Julian calendar.

In sailing, the stars afford to the primitive sea-faring peoples the only means of finding their way when the land can no longer be seen. From the necessities of sea-faring the greatly advanced knowledge of the stars possessed by the South Sea peoples has arisen; this is because practical ends are served not by a priestly wisdom, but by a profane. Nevertheless the knowledge of the stars is a secret which is carefully guarded in certain families, and kept from the common people — as is reported of the Marshall Islands [1]. Among the Moanu of the Admiralty Islands it is the chiefs who are initiated by tradition into the science of the stars [2]. On the Mortlock Islands, where the science of the stars is very highly developed, there was a special astronomical profession; the know-

[1] Erdland, pp. 16 ff.; cp. above, p. 126. [2] Parkinson, p. 377.

ledge of the stars was a source of respect and influence, it was anxiously concealed, and only communicated to specially chosen individuals[1]. Only a few can determine the hours of night by the stars. The Tahitian Tupaya, who accompanied Cook on his first voyage, was a man of this kind, specially distinguished for his nautical knowledge of the stars[2]. The elements of the science, however, seem to have been pretty generally known, and from the Caroline Islands comes a curious account of a general instruction therein. It was first mentioned by the Spanish missionary Cantova in the year 1721, and was later confirmed by Arago. In every settlement there were two houses, in one of which the boys were instructed in the knowledge of the stars, and in the other the girls; only vague ideas were imparted, however. The teacher had a kind of globe of the heavens on which the principal stars were marked, and he pointed out to his pupils the direction which they must follow on their various journeys. One native could also represent on a table by means of grains of maize the constellations known to him[3]. This is a nautical, non-priestly astronomy, which has really little to do with calendarial matters in general, although as a matter of fact in the Carolines and the Mortlock Islands it has led to the naming of all months from constellations, and therefore to a systematic sidereal regulation of the calendar[4].

On the other hand the priests also have observed the stars and used their stellar science principally for sooth-saying, as e. g. in Hawaii and in Babylonia. But neither does this lead to any improvement of the calendar, since the religion must keep to the existing lunisolar calendar, although in one case of the most far-reaching importance the astrology arose from it. The improving of the calendar, the object of which must be, after the full development of the lunisolar, to return to the solar calendar, in order that the calendar may be better adapted to the needs of practical life, becomes henceforth the task of the lay scientific astronomer.

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[1] Kubary, p. 62. [2] Forster, p. 441; cp. above, p. 125. [3] Kötz, p. 64. [4] Above, p. 210.

CHAPTER XV.

CONCLUSION.

1. SUMMARY OF RESULTS.

The concrete nature of the time-indications. Any genuine system of time-reckoning must admit of numerical treatment, i. e. it must consist of divisions of which the length is strictly limited and which, when they belong to the same order, are as far as possible of the same length. A numerical conception is abstract and not primitive; even the power of counting is little developed among primitive peoples in general, and among the lowest peoples it is extremely limited. Counting is abstract, the primitive man clings to the concrete phenomena of the outer world. In matters of chronology, therefore, he finds his way not by counting but by referring to the concrete phenomena the recurrence of which in definite succession experience has taught him to expect. The first time-indications are therefore not numerical but concrete. Their character clearly appears e. g. when 'a sun' is said for 'day', and 'a sleep' for 'night'; the hours of day are denoted by the concrete phenomena of the twilight, dawn, sunrise, etc., and the equally concrete position of the sun or the occupations of the day. The lunar month is usually called 'a moon', and its days are denoted by the phases and position of the moon. The year is originally neither a period of time nor the circle of the seasons (which is first gradually developed under the influence of agriculture in particular), but the produce of the year: e. g. it embraces the time between sowing and harvest, and is often not a complete year in our sense. Only gradually does the year develop into the period of time that elapses between a season

and the recurrence of the same season, or more rarely between a phase of a star and the return of the same phase. From the latter period the genuine solar year has arisen. The seasons are composed of occupations and of climatic and other natural phenomena, and still preserve this concrete relationship and are therefore not definitely limited in duration. This relationship is also extended to the moons, which for their determination are not numbered but are brought into connexion with a natural phase and named accordingly, so that the twelve to thirteen months of the year can be fixed as regards position and succession. Even the Julian months, as they were introduced among less cultivated peoples such as the ancient Germans, the Slavs, etc., could not keep their names, since these had no intelligible meaning or reference to a concrete phenomenon; in order to provide for this the months were re-christened with indigenous names which are of the same kind as those given by the primitive peoples to their lunar months. Or else, but much more seldom, the Latin name acquired the concrete significance of a season. The years also are not numbered, but are named from an important event, so that their succession follows from the historical succession of events, a method of denoting the year which prevailed throughout antiquity in the *limmu,* archon, and consular years, etc.

Discontinuous and 'aoristic' time-indications. The starting-point for the time-reckoning is therefore afforded by the concrete phenomena of the heavens and of surrounding natural objects, and the succession of these, fixed as it is by experience, serves as a guide in the chronological sequence. These phenomena extend over periods which are very dissimilar to one another and are individually of varying length; they cross and overlap in some cases, in others they leave gaps. The time-indications are not directly connected with each other, but this connexion is achieved by the phenomena in question. Hence the indications are not circumscribed by one another, but the phenomena as such are regarded. The latter are not conceived of as divisions of time of a definite length; they do not appear as parts of a larger whole, limited on both

sides by their connexion with other divisions of time. The conception of continuity, the immediate fusion of the chronological phenomena into one another, is lacking: the time-indications are discontinuous. We may speak, although not quite correctly, of a discontinuous time-reckoning. We think, for example, of the abundant sub-division of the times of day in the morning and evening, and the small number of sub-divisions in the night and day-time, of the many very unequal seasons which encroach upon one another and overlap. General measures for shorter periods of time are therefore not given by the time-indications proper, but are derived from actions or occupations, e. g. the time needed to traverse a well-known piece of road. When a systematising of these time-indications takes place, e. g. in the matter of the seasons, where only those of practical importance are rendered prominent and are circumscribed, there arise divisions of very unequal length, which are hardly suitable for a genuine time-reckoning.

The times of day are often given by reference to the position of the sun. In northern countries, where the length of the daily course of the sun varies so greatly, points on the horizon are sought out as an aid. Both these methods of indicating the times of day may seem to afford a foundation for a continuous reckoning, but this is not the case, since they always refer only to the position of the sun at the immediate moment: they are — to adopt a grammatical term — 'aoristic'. The discontinuity is further shewn in the fact that it is only later and in an imperfect fashion that the complete day and the year are joined together in continuous circles. Day and night were combined so late into the period of the complete day of 24 hours that most languages are without a proper word to express this idea. In the same way the reckoning was often long carried out in half-years, winters and summers, or the years were of shorter duration than the solar year (agricultural years, etc.).

The means of accurately determining the times and occupations of the year is afforded by the phases of the stars, which always recur at the same time of the year or at a time subjected to only slight variations due to the conditions of observation. A time-indication from phases of stars is properly

of the discontinuous and 'aoristic' order, since a definite phase of a star belongs theoretically to a certain day and practically is also kept within very narrow limits. It is only with great difficulty and some violence that the phases of the stars can be systematised, — and that at a far-advanced stage: signs of the zodiac, moon-houses — since they are distributed very unequally over the year, this being due more particularly to the limitation in practice to certain specially prominent stars.

The pars pro toto counting of the periods. The regular recurrence of the periods at once impresses itself upon the notice of man: he may also feel the necessity of counting the periods. As he always directs his attention to the single phenomenon in itself, and not to its duration as given by the limitations imposed by other phenomena, so he does not reckon the periods of time as a continuous whole, but only counts an isolated phenomenon recurring but once in the same period. When he has seen ten harvests, he is ten years old: when nine new moons have risen after conception, the nine months of pregnancy are at an end: whoever has slept six nights on the way has undertaken a six days' journey. As counting-points the times of rest — the nights and the winters — are especially employed. Linguistically this method of counting still exists, as when in most languages the complete day of 24 hours is expressed by the word 'day', which also means day opposed to night, or as in the Hebrew word for month, which really means 'new moon'. Popularly and in the language of poetry this usage is still farther extended.

It is significant of the deep-rooted tendency to the *pars pro toto* method of counting that when peoples who are at a less developed stage adopt such a continuous unit of time as our seven-day week, they do not regard it as a unity, but put the part for the whole. Weeks have been introduced into the Society Islands, and the word *hebedoma* has there been adopted to denote a week; it is however less frequently used by the people than the word 'sabbath'. When a native wishes to say that he has been absent for six weeks on a journey, he usually says six sabbaths or a moon and two sabbaths [1]. Some of the

[1] Ellis, *Pol. Res.*[2], I, 89 ff.

Islamite Malays of Sumatra count periods of time in Sundays, others in Fridays, others again in market-days [1]; these are therefore the Christian, the Islamite, and the native methods of reckoning weeks that here appear, but still the counting is performed by the *pars pro toto* method. The Old Bulgarian word *nedelja* really means 'day without work', Sunday, but has come to mean 'week' [2].

The continuous time-reckoning arises neither from the daily course of the sun — which indeed is a unit but has no natural sub-divisions — nor yet from the year, the consistent length of which is at first concealed by the variation of the natural phases. Moreover the year, though sub-divided, is divided into parts (the seasons) which are indefinite and fluctuating in their number, duration, and limits. The only natural phenomenon which from the very beginning meets the demands of the continuous reckoning is the moon. It is a fact of importance that the course of the moon from the first appearance of the new moon to the disappearance of the old is so short a period that it may be surveyed even by the undeveloped intellect. The decisive factor however is that not only is the lunar month in itself a limited and continuous period of fixed length, but it has also a natural sub-division into parts of equal length, viz. days, each of which is clearly distinguishable from its predecessor and successor by the shape of the moon and its position in the sky at sunrise and sunset. However these phases and positions also are at first described concretely, and not numbered. The months, like other periods of time, are counted by the *pars pro toto* method in new moons, or commonly in 'moons', as the days are counted in suns. This is in itself a shifting mode of reckoning, which proceeds from an arbitrarily chosen incidental point. With primitive man's undeveloped faculty of counting it can only embrace a few months; the months of pregnancy, which are so frequently counted, form a period which is quite sufficiently long.

Empirical intercalation of months. When a month not

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[1] Maass, p. 512. [2] Feist, p. 262.

lying in the immediate past or future is to be indicated, the concrete mode of reckoning comes to the fore in this case also, and since a month covers a period of time which is relatively long enough for the natural conditions seen in it to be clearly distinguishable from those of the preceding and following months, the month is named after these natural conditions, i. e. it takes the name of a season. But this is not done without confusion, for both seasons and months fluctuate in reference to their position in the solar year, and the seasons are not limited in length and duration, and still less do they cover the months. Since any season and any natural phenomenon may be used to determine a month, it follows that the number of names of months is at first quite an arbitrary and uncertain matter, and is far greater than that of the months of the year. Linguistic custom leads to a natural selection in which the names describing phenomena of special importance are preferred. Thus a fixed series of months arises; and since the year contains more than twelve and less than thirteen lunar months, the series sometimes consists of twelve, sometimes of thirteen months. The period thus arising is nothing else than the lunisolar year, since the months through their connexion with the seasons are bound up with the annual course of the sun. The problem then arises how to make the lunar months fit into the solar year. Practically the difficulty first appears in a disguised form; primitive man has no conception, or at most only an extremely vague idea, of the length of the solar year. If the months are allowed to follow one another in their traditional order the connexions with the phases of nature are soon put out of gear, which never happened so long as the relationship was occasional and fluctuating. This defect must be corrected. When the series has thirteen months, a month soon falls behind the natural phenomenon from which it takes its name: one month must therefore be omitted. This is the extracalation of a month. When the series has twelve months, a month soon gets in front of the natural phenomenon from which it takes its name. Then the month is 'forgotten', i. e. it is regarded as non-existent, and its name is given to the following month, from which

point the series once more runs on correctly for some time. This is the intercalation of a month. The necessity for the omission or intercalation is recognised in the first place from the natural phases: their fluctuation makes matters still worse. Hence there often arise hot disputes as to which month it really is, i. e. really, theoretically speaking, as to the inter- or extracalation of a month. A fixed order arises in this intercalation or omission when its arrangement is entrusted to the priests, a body of officials, or even to a single person appointed for the purpose, as among the ancient Semitic peoples and in Loango.

Since the seasons are regulated by the phases of the stars, the months can also be named after these phases and regulated by them, and a very accurate and practical means of regulation is thus afforded. When a phase of a star does not appear in the month to which it gives its name, the month is 'forgotten', the next month brings round the phase in question, and takes its name. A series of twelve months is here assumed; in the series of thirteen the phase of the star appears too early, consequently the month-name which is in the series is crowded out by the following month-name, which is derived from the name of the star in question. Cases of doubt seldom arise here, since they can only occur in the exceptional instance when the phase of the star falls on the border-line between two months.

By means of a properly treated empirical intercalation of this nature the series of months could be kept in fair agreement with the phases of nature, and also, especially when the phases of the stars were used as an aid, with the solar year. Where, as in Babylonia, the sense of the observation of the heavens was developed, there thus arose a fruitful problem for the rudimentary and still quite empirical astronomy, viz. that the astronomical points of regulation for the arrangement of the lunar months within the solar year had to be determined by more and more refined observation. So accurate an empirical regulation must keep the intercalation in very good order, as it did in Babylonia as early as the time of Dungi in the latter part of the third millennium B. C. Meanwhile there must have arisen of itself the knowledge that in

a certain number of years a certain number of intercalations always fell; the simplest relationship is three intercalary months to eight years. The intercalation might then very well have been cyclically regulated, but there was no reason for departing from ancient custom, since the old method worked well and there was no need to be able to calculate the calendar for a long period in advance. This is in practice seldom necessary — how often, for instance, is it necessary to-day to determine years beforehand the position of Easter? — but for scientific astronomy it is a necessity to be able thus to calculate in advance. Hence it agrees very well with the flourishing of the theoretical astronomy in the time of the Persians that an intercalary cycle should be introduced about the year 528 B. C.

Seasons and months may also be regulated by points of the annual course of the sun; but these are difficult to observe, and for their observation land-marks, and therefore a fixed dwelling-place, are required. Even then it is only the two solstices that are accessible to primitive observation, and this is specially easy in northern latitudes only. Hence the solstices and equinoxes play a comparatively unimportant part in the history of time-reckoning.

2. THE GREEK TIME-RECKONING [1].

I pass on finally to speak of the Greek time-reckoning. The problem is here not only the independent appearance of a time-reckoning which is in all respects genuinely continuous, but also the cyclical regulating of the intercalation.

In the Homeric poems the time-reckoning stands at a primitive stage, and is indeed lower than among many barbaric peoples. Very few natural times of day are recognised, the days are counted by dawns, according to the *pars pro toto* method. Four larger seasons are known, but also smaller ones, e. g. attention is paid to the birds of passage. Certain phases of stars are known, and also the solstices [2]. The lunar

[1] With this section compare my *Entstehung etc.*, where a fuller discussion and authorities are given. [2] Above, pp. 33 ff., 46 f., 72 f., 110 ff.

months are counted, e. g. the months of pregnancy [1], but not named; the day of new moon is celebrated. In Hesiod the same time-reckoning appears further developed, a fact which is due partly to the nature of the contents of his poem, partly to its later date; in particular, phases of stars and smaller seasons are frequently mentioned, and it is a great advance that the days are numerically reckoned; they are counted in one case from the solstice, and further the days of the month are counted, sometimes in half-months, sometimes in decades. [2] In the appendix of the *Days* an exceedingly strong day-superstition shews itself.

When history begins, the Greek time-reckoning as we know it appears: it is a lunisolar year with named lunar months, in which the intercalation is cyclically regulated, so that in a period of eight years (Oktaeteris) a month is three times intercalated, viz. in the 3rd, 5th, and 8th years. This appearance of an ordered form of year and a cyclical intercalation is completely unprepared for. We miss that association of the months with the seasons and the naming after these which, as the preceding investigations have shewn, alone gives rise to an empirical intercalation. The investigation of primitive time-reckoning has led to the perception that herein lies the crucial point of the problem of the origin of the Greek time-reckoning. In my opinion the Greek calendar cannot be explained from premisses originating in the country itself, and therefore cannot have arisen of itself in Greece.

The regulation of the Greek calendar has throughout a sacral character. The idea of the selection of lucky or unlucky days prevails not only in superstition but also in the official religious cult. Most of the old festivals fall, according to universal custom, either during or shortly before the time of full moon; the festivals of Apollo form an exception and are all celebrated on the 7th, those of his twin sister Artemis being held on the preceding day, the 6th. The names of months appear in sharp contradistinction to the world-wide method of nomenclature in that they all, in so far as they are

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[1] ἡλιτόμηνος, Il. XIX, 118. [2] Above, pp. 313 and 167.

explainable, are derived from festivals. Several hundred names are known from the various states of the mother country and the colonies, and among these there is only a single exception to the rule just stated, viz. *Ἁλιοτρόπιος*, i. e. the solstice month, which belongs to later times, besides a few unexplained names, such as *Γεῦστος*, *Δίνων*; numbered months were first created among the leagues of states of the period after Alexander the Great, in order to introduce a means of common understanding such as was necessitated by the multiplicity of the local calendars. These cases are all quite isolated and cannot disturb the rule.

The inference that may be drawn in regard to the months from their names and from the ordering of the religious cult is further established by other matters in regard to the cyclical intercalation. The eight-year intercalary cycle cannot be distinguished from the *Ennaeteris* period (so called according to the Greek inclusive method of reckoning, the eight-year period according to our method of expression) of certain festivals. Such festivals are only known at Delphi, where three of them were held (Charila, Stepterion, Herois). The great Pythian games themselves were originally held every eighth year, and then, after the first holy war (probably in the year 582, from which the Pythiads were counted), every fourth year. Since eight years seemed too long an interval, the period was halved in order to secure a more frequent celebration, and the Isthmian and Nemean games were even held every second year, i. e. the period was divided into four. The Olympiad reckoning will go still farther back, if the traditional starting-point, the year 776 B. C., is to be accepted. However the authenticity of the older portion of the list of Olympian victors has been sharply disputed, though the criticism certainly seems to have weakened a little quite recently. But a peculiarity attaches to this festival, viz. that it is celebrated alternately in one of the two consecutive months, Apollonios and Parthenios [1]. This can only

[1] Fotheringham in his interesting paper on Cleostratus (*Journ. of Hell. Studies, 39*, 1919, 177) tries to explain this alternation by the intercalation; if a month was intercalated the games would be transferred from Parthenios to Apollonios. This is in my opinion impossible. The Greek feasts were bound up with the months, which were named from some of them; this association

be explained as follows: — The Oktaeteris has 99 months. Originally the Olympic festival was not fixed according to the calendar, but the date was simply arranged by the numbering of the months of the Oktaeteris, in which the first half of the Oktaeteris was given 50 months and the second 49. In the calendarial Oktaeteris, on the other hand, there is an intercalation once in the first half and twice in the second, i. e. the first four years have 49 months and the next four 50; hence it follows that when the old custom was to be preserved in regard to the date, the month of the festival necessarily varied in the given manner. When the chronological arrangement of the Olympic games was introduced, the Oktaeteris calendar therefore was not known, but only the Oktaeteris period.

The introduction of the calendar was effected in the form of the establishment of *fasti* for festivals and religious cult, in which the periodically recurring notable events of the cult, viz. sacrifices and festivals, were noted down in calendrical succession and in some cases also described. Fragments of these *fasti* from later times have in several cases come down to us, and similar *fasti* formed part of the legislation of Solon. Solon in the year 594 arranged the sacral *fasti* of Athens, and with them the calendar. That he was the first to introduce the calendar cannot be stated; there is no evidence to shew that the specific peculiarities of the Athenian calendar were introduced by him. The evidence is however valuable as a *terminus ante quem*. Plato in his *Laws* prescribes that the legislation shall arrange the festivals according to the decrees of Delphi. Here, as elsewhere in the *Laws,* he returns to the general Greek custom. The *fasti* were therefore arranged under the superintendence of Delphi, and Solon also had certainly done the same, for he stood in other respects in close connexion with Delphi. In addition to which Geminos mentions "the commandment of the laws and the oracular decrees, to sacrifice in three ways, i. e. monthly, daily, yearly". At a later period also, those who superintended the calendar were men learned in sacral matters. Thus the seer Lampon, at the

prevented a feast from being transferred to a month with another name, i. e. the feast was fixed with reference to the name of the month, not to its number.

time of the Peloponnesian War, brought forward a proposal for the intercalation of a month; he was an *exegetes* and perhaps even *πυθόχρηστος*.

From all this it follows that it was the necessity for the regulation of the religious cult that first created the calendar in Greece. The succession of days in the year was in the first place arranged in the form of sacral *fasti*, and this arrangement was followed by the official civil calendar, while the peasants and sailors kept to the reckoning by phases of the stars. All indications — especially the above-mentioned festivals of Delphi, the dictum of Plato, etc. — seem to shew that this regulation originated at Delphi; not that it was actually enjoined by the oracle, but the necessity for the regulation was aggravated there, and its performance was therefore supported and superintended. Only in Delphi could the requisites for the carrying out of such a work be found united. It is the business of the oracle to maintain peace with the gods, and this is above all achieved through the proper cult, in which the dates are of the greatest importance, no less important indeed than the expiation of murder and the veneration of the heroes. In the *pylagorai* and *hieromnemones,* who met twice a year for deliberation, and in the *exegetai* there was a circle closely connected with Delphi, each member of which could spread in his own state the ideas he there imbibed [1]. Certain states maintained special officials who fostered the connexion with Delphi, such as the Pythioi of Sparta, the *ἐξηγηταὶ πυθόχρηστοι* of Athens. And, above all, it is only thus that the consistently sacral character of the Greek calendar and names of months in general can be satisfactorily explained.

There remains something to be added, viz. that, as has been remarked above, all the festivals of Apollo of which the date is known — and they are not few in number — fall on the 7th, on which day also the birth of the god was celebrated at Delphi and elsewhere. It is clear that this is a definitely intended regulation. Otherwise, too, Apollo is the patron of the reckoning in months. Even in Homer the day

[1] Axel W. Persson, *Die Exegeten und Delphi,* Lunds Universitets Årsskrift, vol. 14, 1918, Nr. 22.

of new moon is a feast of Apollo, and later, as *Νεομήνιος*, i. e. new-moon god, he receives sacrifices on the first of each month. The initial day of the third decade was also dedicated to him, for which reason he was called *Εἰκάδιος*. He is without a rival in his importance for the selection of days, which is dependent upon the reckoning in months.

Now, according to the data given above, the cyclical intercalation was introduced before the beginning of the 6th century, most probably in the 7th; at most, on the strength of Hesiod and of Homer (who in the Odyssey knows only the beginning of the development, viz. Apollo as the god of the new-moon festival), we may go back to the 8th. But it has already been pointed out that in Greece the preliminary conditions for the arising of even the empirical intercalation, and much more of the cyclical, are lacking. Whence then has the latter come? This is the real enigma in connexion with the problem of the origin of the Greek time-reckoning. In my opinion the question can only be answered in one way: it has come from without, from the east, and originally from Babylonia. Here we are met with the difficulty that an intercalary cycle was not introduced into Babylonia before the 6th century. But, as we have already remarked, the knowledge that in eight years the lunar months could be brought by the intercalation of three months to fit into the solar year must have been reached long before, through a regular administration of the intercalation, although in Babylonia, where the intercalation was managed by a central authority, there was no reason for erecting this knowledge into a rule. In Greece matters were quite different. The land was split up into a great number of little states in one of which it might often happen that there was no one who could properly manage an empirical intercalation. And even if there were, the empirical intercalation must soon have led to variations in all these different states, and hopeless confusion must have arisen. Since Delphi was not a central court which could look after the intercalation, there must be established, if order was to be created, — and the whole movement started with this idea — a cycle which should be binding in the future.

It seems to me a well-authorised view that the god Apollo came to Greece from Asia, and even apart from this there is reason to suppose that in the religion of Apollo there is a Babylonian element, viz. the prevailing importance of the seventh day of the month in the cult of the god. A similar preference for the seventh day of the month is seen again in the *shabattu*. And in point of fact it is originally only the seventh day that is brought into prominence, the other *shabattu* being a later development from this [1]; most of the Apollo festivals were rites of expiation and purification, and the *shabattu* also are distinguished as such. The calendar also shews a second trace of connexion with Asia Minor. Besides Apollo there is only one deity, Hecate, that is closely connected with the calendar and the superstition of the days of the month, and it has been proved that this goddess too originated in Asia Minor [2].

When the intercalary cycle was introduced from the East about the 7th century it did not come alone, but formed part of a mighty stream of civilisation which poured into Greece from the East at an early period. This is shewn e. g. in art, where all the styles formed under Oriental influence displace and transform the native geometrical style in vase-painting and the minor arts. Even in astronomy Oriental influence can be demonstrated. Astronomical science begins with Thales, who foretold the famous eclipse of the sun on May 28, 585 B. C. According to one isolated notice he also concerned himself with the lunisolar calendar. But the Ionian astronomy has a Babylonian foundation; evidences of this are the division of the day into 12 hours, and the signs of the zodiac, of which at least three can be shewn to be of Babylonian origin, and one is an Old Ionic transformation of a Babylonian original. But, it is said, the way from Ionia to the mother country is long, and the development of the mother country is in arrears. But even with Delphi the Ionians had early connexions; we may remember Croesus of Lydia. In the sixth century the eastern Greeks established splendid treasure-houses at Delphi, and long

[1] Above, p. 330. My statement in *Archiv für Religionswissenschaft, 14,* 1911, pp. 435 and 448 n. 1, is to be tested by this. It agrees exactly. [2] See my *Griechische Feste,* p. 397.

and intimate connexions must have preceded buildings of this nature. All the necessary conditions for the development assumed can therefore be demonstrated, as well as can be expected from the scanty nature of our sources for this period.

The introduction of the cyclical regulation of the calendar has again introduced problems of far-reaching significance for scientific astronomy, though now upon a higher plane. The eight-year cycle was inaccurate, the problem was to find a more exact one, and how fruitful this problem became is shewn by such names as Meton and Kallippos. This difficulty prepared the way for the emancipation of the time-reckoning from the fetters of the religious cult.

ADDENDUM TO P. 78 NOTE 1 (P. 80).

Prof. Beckman has kindly pointed out to me that according to Are's *Islendingabók,* ch. 7 (*Þá vas þat mælt et næsta sumar áþr i lǫgum, at menn scyllde svá coma til alþinges, es X vicor være af sumre, en þangat til quómo vico fyrr)*, the Althing in the year 999 A. D. was decreed for the time when ten (instead of nine) weeks of the summer had passed, i. e. it was postponed until a week later in the calendar. The reason for this is undoubtedly that the calendar (the week-year), and with it the Althing, had contrived to antedate itself a little more than a week in relation to the natural year, after Torsten Surt's reform of the calendar had been introduced about the year 965. Here therefore we have an example of the empirical and occasional correction of the Icelandic calendar which was postulated above.

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